AEROSOL AGE

THE MAGAZINE OF PRESSURE PACKAGING

- Spray Particle Evaluation
- Dry Ice Propellant
- Aerosols and Food Technology
- Hair Spray Toxicity
- Curl Strength with Hair Sprays
- Aerosol Publicity Program
- Metal Fabrications' Plant

JULY, 1959

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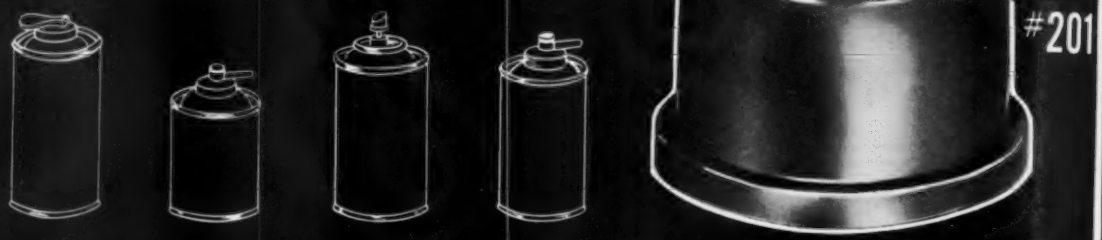

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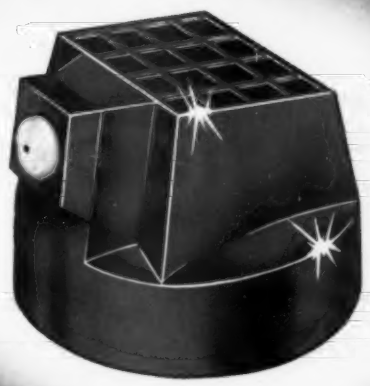
by Aerosol Research



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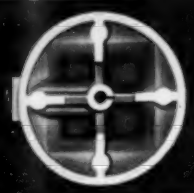

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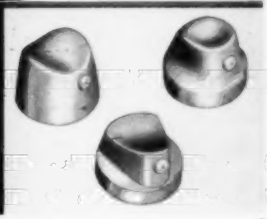

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LETHANE 384

THIS MONTH'S COVER

A new plastic container material, Union Carbide Plastics Co.'s "Bakelite Brand C-11" styrene acrylonitrile copolymer, is being used to package the perfume mist and cologne mist marketed by Miahati, Inc., New York. One ounce perfume mist retails at $2.50, three ounce cologne mist at $3.50. Valve is by Precision and company is doing its own filling.

JULY, 1959 VOL. 4, No. 7

AEROSOL AGE

The magazine of pressure packaging

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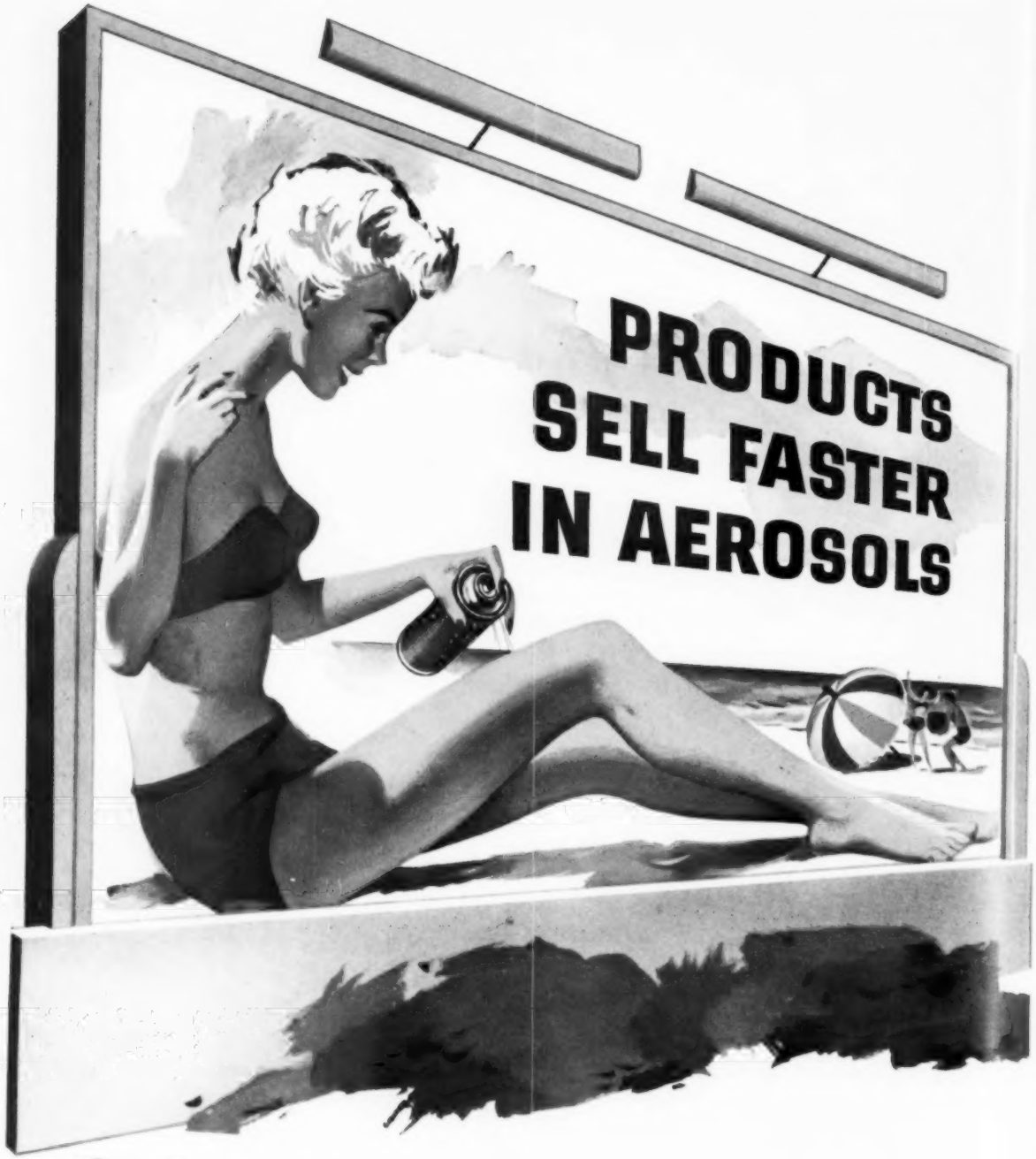

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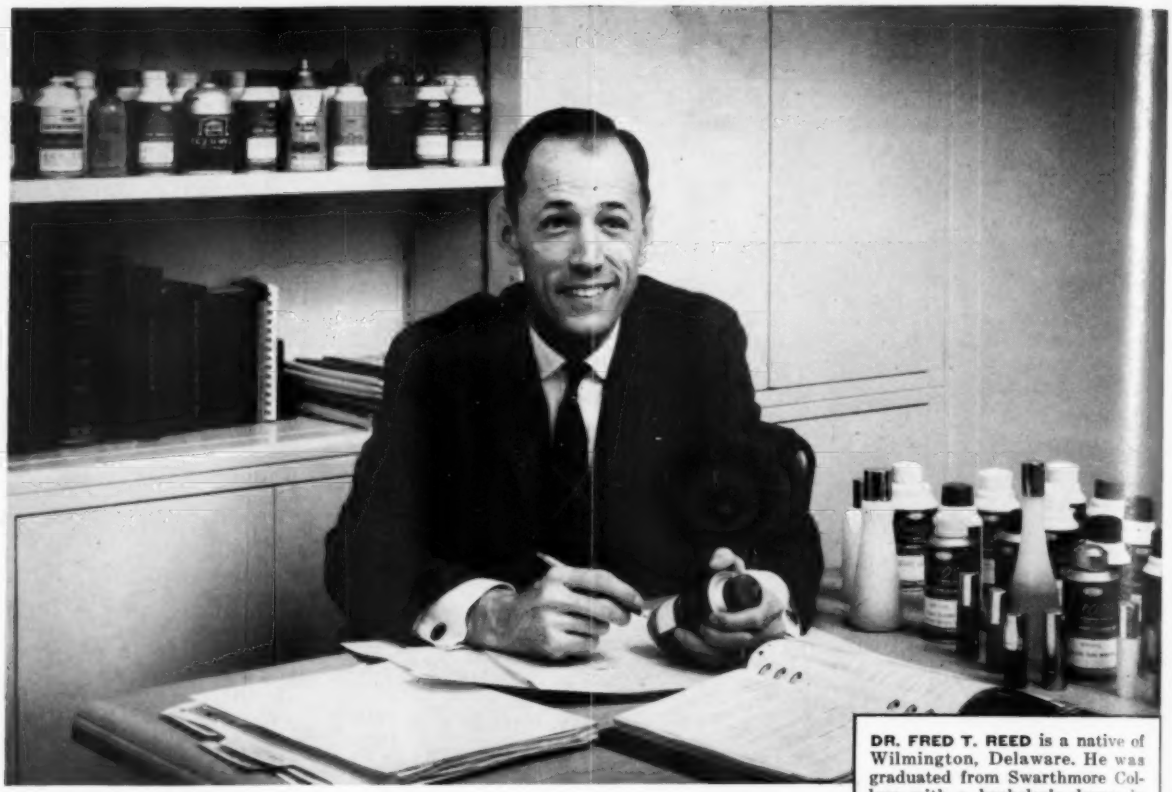

DR. FRED T. REED is a native of Wilmington, Delaware. He was graduated from Swarthmore College with a bachelor's degree in chemistry, then joined the Army. He served in the Pacific area during World War II, attaining the rank of captain. Following his discharge from the Army, Fred entered the University of Maryland, where he obtained his Ph.D. degree in chemistry. He joined the Du Pont Company as a research chemist in 1950 and was assigned to the "Freon" Products Division. Fred has done a variety of work for the aerosol industry including methods for moisture analysis of propellents, propellent systems for low-pressure cosmetic aerosols and studies of anti-perspirant compounds. Currently, Fred is in charge of all sales service work for the aerosol industry at the "Freon" Products Laboratory at Chestnut Run near Wilmington.

"Du Pont's technical know-how helps our customers develop or improve their aerosol products"

says Fred T. Reed of Du Pont

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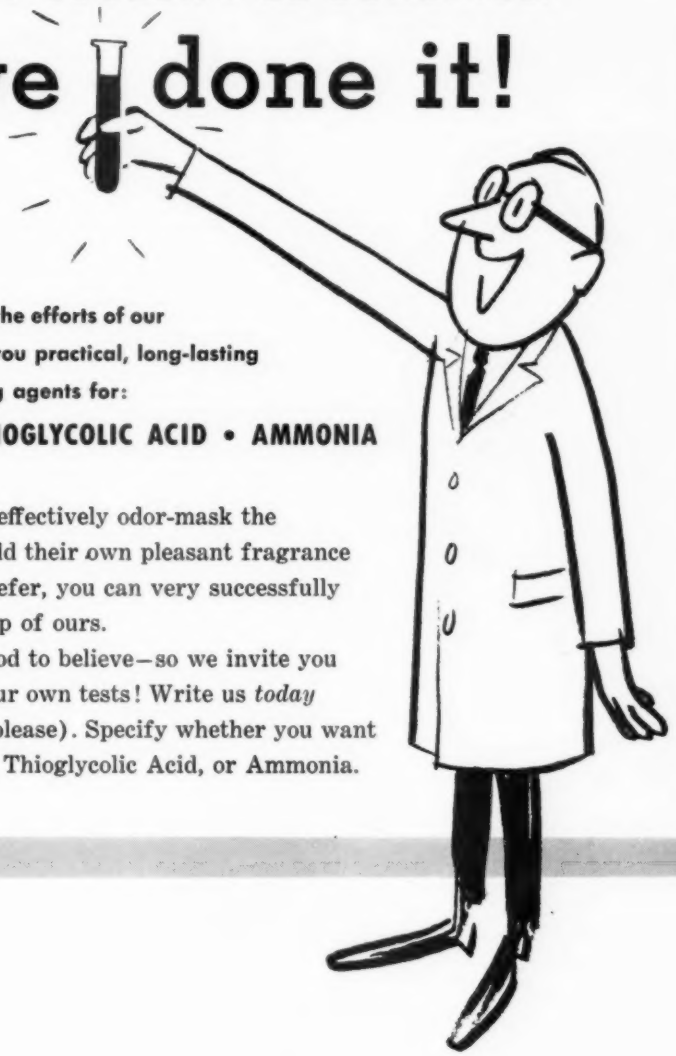

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INDUSTRY CALENDAR

Western Packaging & Materials Handling Exposition, Civic Auditorium, San Francisco, Aug. 11, 12 & 13.

American Management Association Packaging Seminar on Packaging Management (Costs and Controls), Colgate University, Hamilton, N. Y. Aug. 17-21.

Chemical Specialties Manufacturers Association, Meeting of Board of Governors, Executive Board and Committees, St. Moritz Hotel, New York, Sept. 15-16. (Association Members' Luncheon Sept. 15.)

Canadian Agricultural Chemicals Association, Chateau Frontenac, Quebec, Sept. 20-24.

Industrial & Building Sanitation - Maintenance Show and Conference, N. Y. Trade Show Building and New Yorker Hotel, New York, Sept. 22-24.

American Management Association Packaging Seminar on Packaging Line Layout, Hotel Astor, New York, Sept. 28-30.

CSMA Aerosol Industry Technical Clinic, New York, (site to be announced), Oct. 17.

National Paint, Varnish & Lacquer Association, annual convention, Chalfonte-Haddon Hall, Atlantic City, N. J., October 19-21.

National Agricultural Chemicals Association, Sheraton Lick Hotel, French Lick, Ind. .....Oct. 21-23

CSMA Aerosol Industry Technical Clinic, Chicago (site to be announced), Oct. 24.

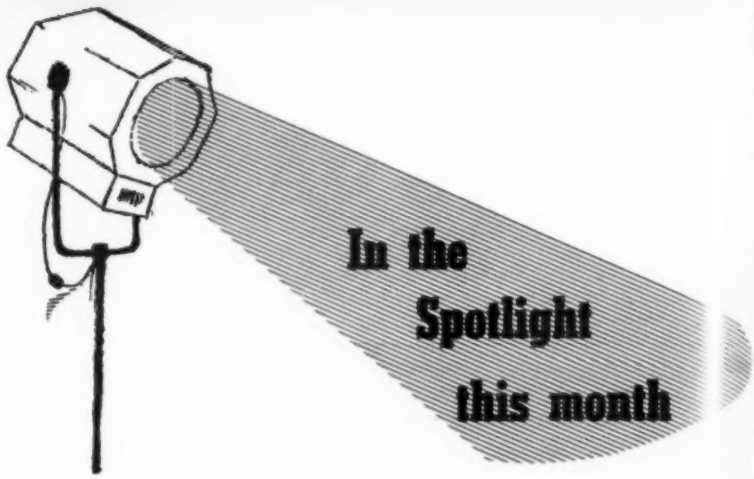
Canadian Manufacturers of Chemical Specialties, second annual meeting, Royal York Hotel, Toronto, Nov. 2-4.

American Management Association Packaging Seminar on Fundamentals of Packaging Specifications, Hotel Astor, New York, Nov. 9-11.

Packaging Machinery Manufacturers Institute, annual show, New York Coliseum, New York. Nov. 17-20

Toilet Goods Association, winter meeting of Scientific Section, Waldorf Astoria Hotel, New York Dec. 1

Chemical Specialties Manufacturers Association, 46th annual meeting, Mayflower Hotel, Washington, D. C.....Dec. 7-9



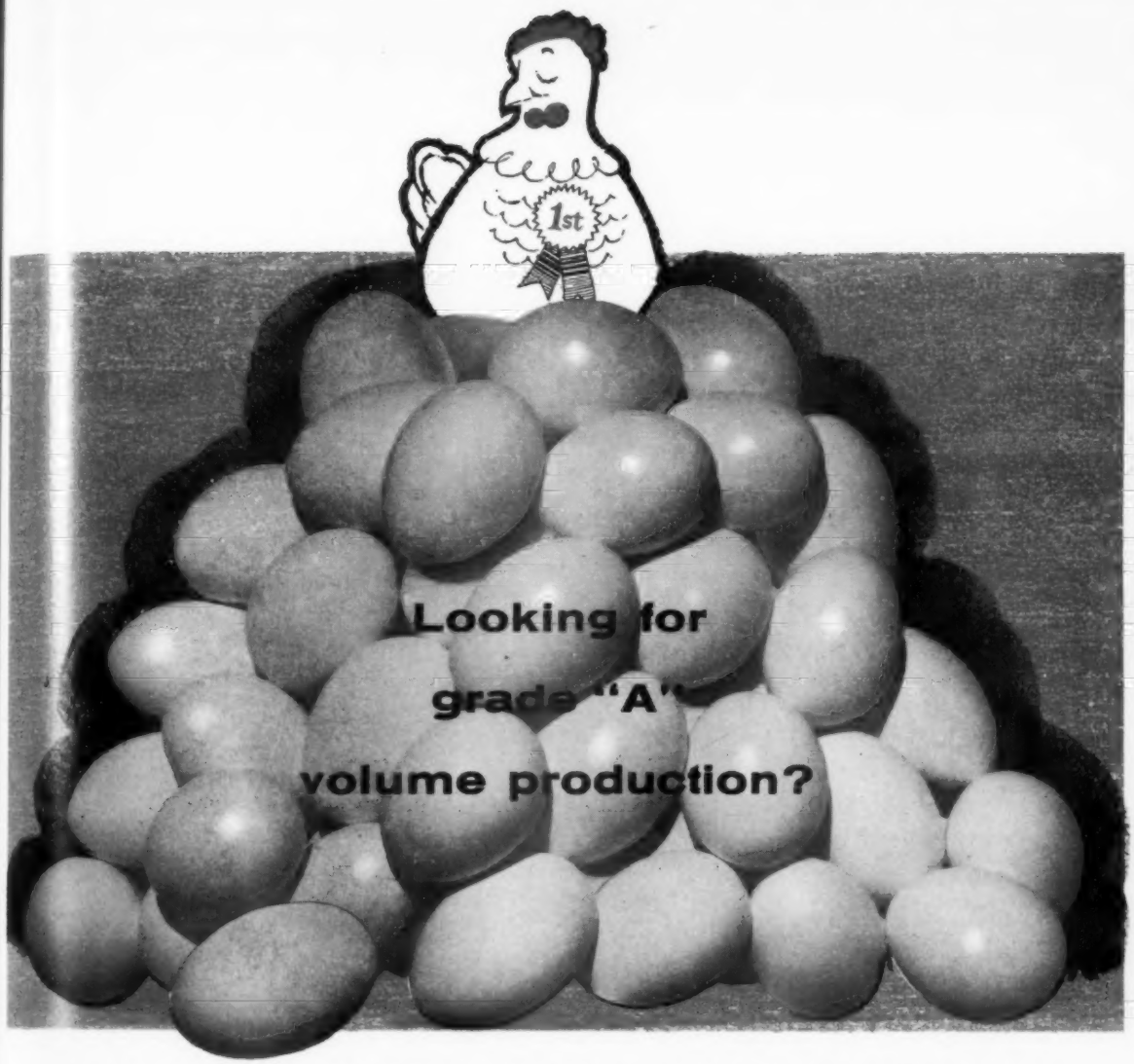
• **Further Experiences with Dry Ice Propellant** . . . The long awaited "follow up" report on further studies with this radically new aerosol propellant begins on page 24. In his new article, Dr. Haase mentions several new product possibilities for this type of package.

• **Aerosols and Food Technology** . . . Another European expert discusses some of the basic considerations sometimes overlooked by the aerosol food packager. His article, on page 29, was originally given before the May meeting of the International Aerosol Association.

• **Aerosol Hair Sprays** and **Determination of Spray Particles from Aerosol Containers** . . . In a doublebarrelled attack on the **New England Medical Journal** article of last year, **Aerosol Age** presents two significant articles to refute the claims that aerosol hair sprays are toxic to users. Two government agencies, the USDA and the FDA, combine forces to determine for sure whether hair sprays can be blamed for various lung ailments. The now celebrated Draize report appears on page 36, and the later Fulton paper to the May CSMA meeting begins on page 22.

• **Metal Fabrications** . . . Ever wonder how luxury type perfume containers are made? **Aerosol Age** takes you on a step-by-step tour of the plant of one of the leading fabricators of this type container. Photos and story appear on page 34.

• **Determination of Curl Strength with Hair Sprays** . . . A highly scientific paper describing an accurate method of determining the effectiveness of aerosol hair sprays appears on page 41.



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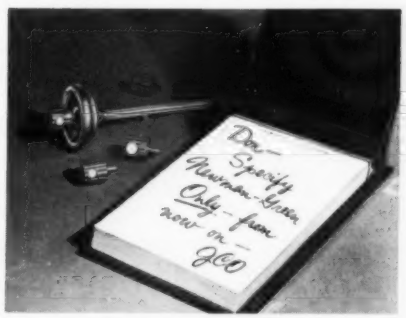

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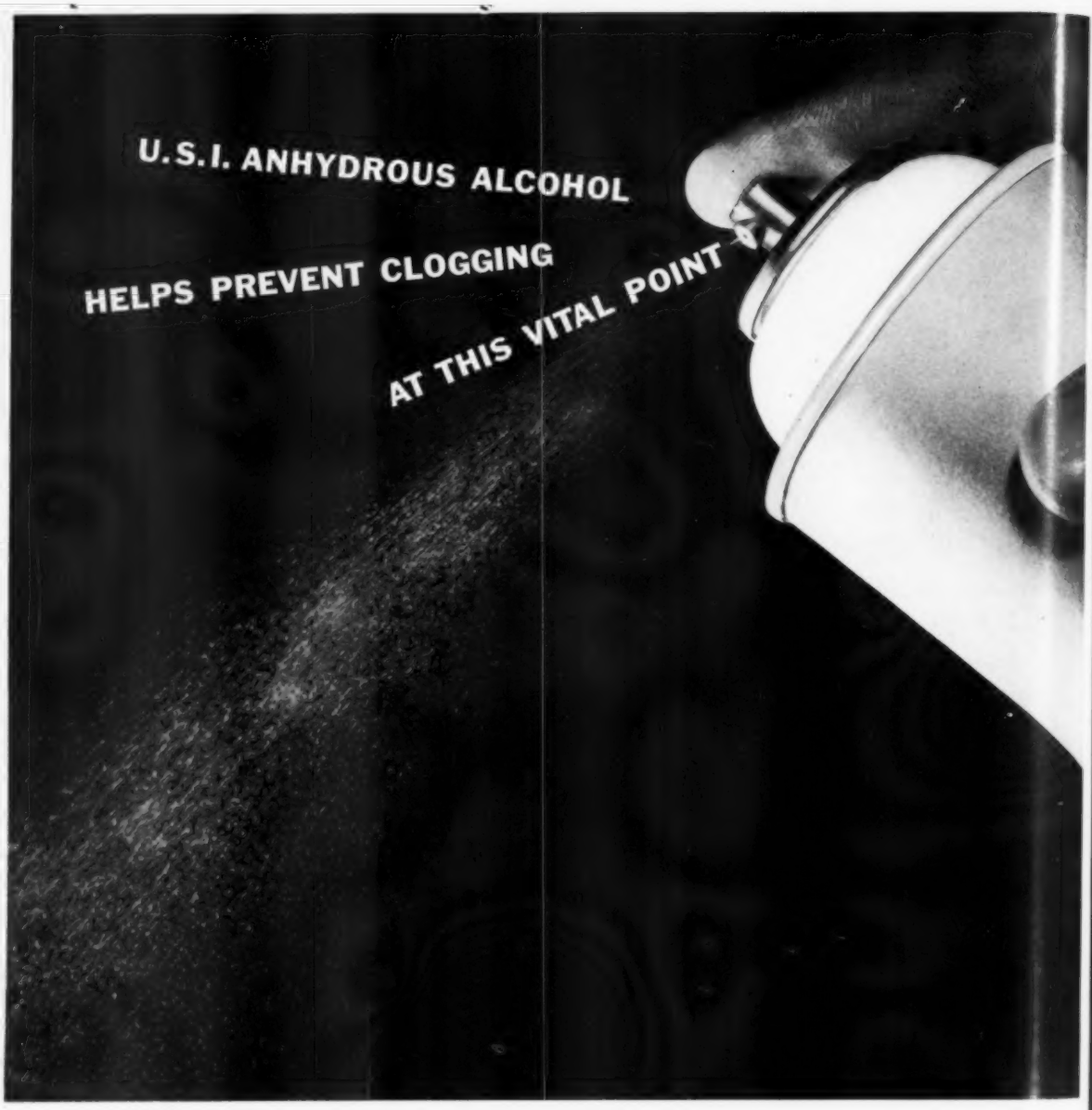

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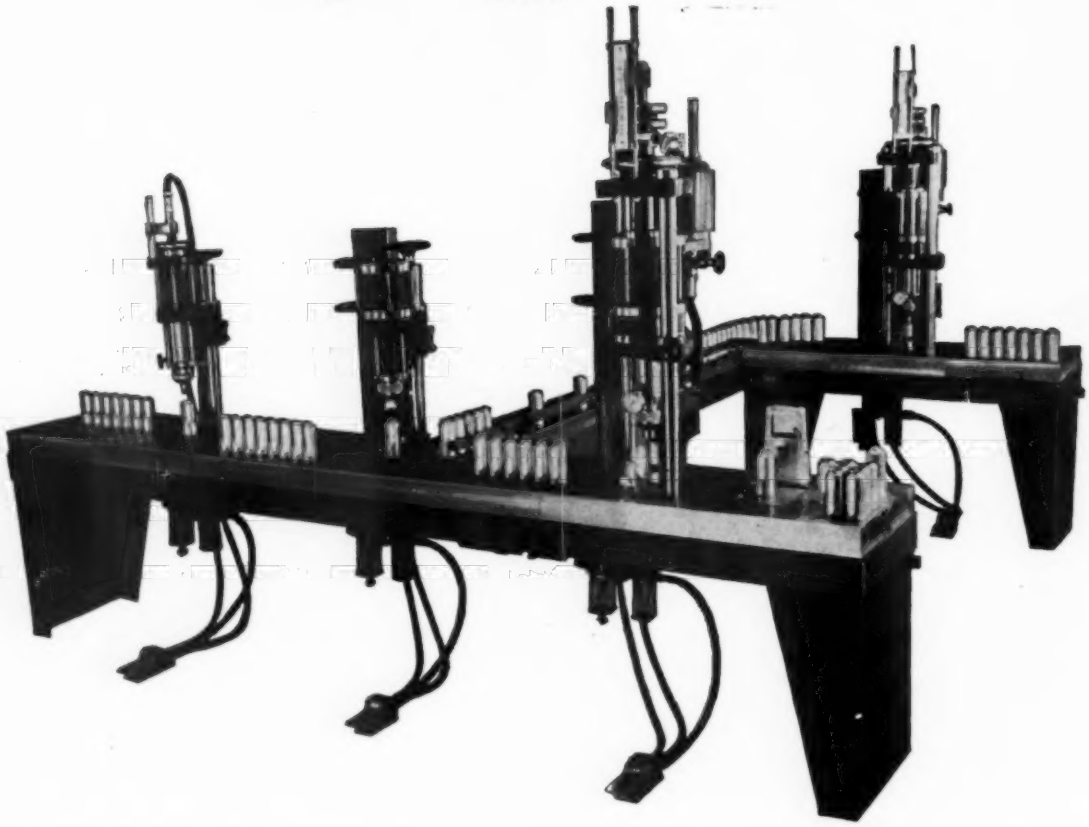

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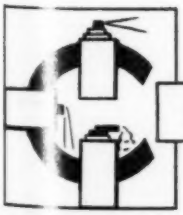

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* *Reg. U.S. Pat. Off., FMC.*

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EDITORIALS

Aerosol Technical Clinics . . .

THE decision of the Chemical Specialties Manufacturers Association to hold two regional aerosol clinics smacks of pure genius! The association has long needed a way to lure the aerosol technical personnel of perfume, pharmaceutical, and food marketing firms into participating in the valuable technical sessions conducted during the normal course of the association's semi-annual meetings, and this aerosol clinic idea should provide the perfect medium.

The fact that one clinic will be held in New York, and another in Chicago, should be especially welcome news to aerosol marketers in those areas. If the clinics are successful (and if conducted well they are bound to be), possibly additional sessions can be scheduled next year for other cities.

According to General Chemical's Joseph Tomlinson, the clinics will be designed mainly for junior level management, operators, and technicians on a purely technical and non-commercial level. Non-members of the association will be welcome, and the only limitation on attendance will be payment of a nominal registration fee (about $10) plus an interest in aerosol packaging. It is expected that the clinics will be particularly valuable to marketing and research personnel in the major marketing companies who may need a fundamental grounding in aerosol technology *before* their companies go into aerosol packaging on a production scale. The clinics are also expected to attract sales promotion and similar *special* personnel who will have to be acquainted with the advantages of the aerosol package (and of what goes into it) before they can be "turned loose" on the consumer public.

In addition to its obvious appeal for aerosol personnel both outside and within the CSMA, the clinics should go far toward making the work of the association far better known in the pharmaceutical, toilet goods, and food fields. In the long run they will work toward acquainting the management of key marketing companies with the obvious advantages of the aerosol package.

Wherever these clinics have been discussed, there has been an atmosphere of optimism. We think the idea warrants such optimism.

The CSMA Product Survey . . .

DESPITE the explanation of the 1958 CSMA Aerosol Product Survey in this and other trade publications, people in the industry continue to be very much disturbed by the dips registered in a number of product types. In fact, we have heard the opinion expressed more than once that possibly the figures for last year might better not have been published at all!

Actually, once such a survey is begun on a yearly basis, it would be extremely unwise to discontinue publishing its results in any given year. Too often influential people among the major marketers, market study organizations, and people within the association rely on the product survey for trends in product types, containers, etc.

What might better be done is to stress (even in the "good" years) that the results of the survey must always be subject to projection because so many of the fillers *fail* to report their product totals. This approach to the problem will serve to caution the optimists not to think too much of a "good" year; and at the same time warn the pessimists that perhaps 1958 wasn't actually a bad year after all.

Evaluation of

Spray Deposits and Inhalation Particles from Aerosol Sprays

*By A. H. Yeomans and R. A. Fulton**

Entomology Research Division
Agricultural Research Service
U. S. Department of Agriculture
Beltsville, Md.

WITH the increasing use of pressurized sprays for many types of products there is the possibility that some question might arise regarding the inhalation hazard of the particles, whether they come directly from the container or from the unimpinged particles in the air. Our study of the properties of such particles covers a period of 14 years. However, the present remarks will be limited to showing that the physical properties can be utilized to produce a satisfactory spray with a minimum of unimpinged particles.

When a spray product is being developed, the exact requirements should first be determined. It is well known in the paint spraying trade that the consistency of the product, the spray pattern, the pressure used, and the distance that the dispenser is held from the surface, are important in obtaining uniform coatings. This is also true for numerous other types of application where atomizing or pressure sprays are used. Uniformity of application is obtained by releasing the material at fixed distances.

When a pressurized spray product is developed for home use, the distance that the dispenser will normally be held from the surface should first be determined. In most cases this distance will fall between six and 24 inches, depending on the product to be dispensed. When this distance has been established, the formulation, the valve, and the orifices must be selected to give the desired output and particle size for the established distance. With our present knowledge of particles it can be stated that a product can give good spraying characteristics at only one distance and cannot be designed to give good performance over a wide range of distances.

The tests we have found satisfactory for evaluating a spray are as follows:

1. Output rate of the dispenser.
2. The particle size.
   (a) From the dispenser to the target.
   (b) The unimpinged spray.
3. Residue impinged on a vertical surface and that settled out on a horizontal surface below the vertical one.
4. Particles found in the air after spraying the surface.

The output of the dispenser is determined by discharging the unit for 10 seconds, weighing before and after. The output depends on the pressure of the formulation, the sizes and arrangement of the orifices, and the physical properties of the formulation.

The particle size is the most complex of the tests, especially if the formulation is composed of many ingredients of different volatility. In some cases the volatility changes so rapidly that it is almost impossible to determine the particle size except by indirect methods. One direct method was described by Yeomans(2) in 1953. It is sometimes necessary to cover the slides to prevent evaporation of solvent from the particles collected. At short distances with most spray formulations containing alcohol, the volatile particles are collected in heavy clear mineral oil. Particles several feet from the dispenser are collected on silicone-coated slides.

The amount of residue impinged

TABLE II

Deposit obtained on a vertical surface from several pressurized insecticide formulas – 12 inches from discharge

Formula	*Discharge rate g./sec.*	*Particle size MMD*	*Max.*	*Deposit 12 inches from source*
Aerosol G-845	2.4	28	100	40
A	1.5	42	125	77
B	1.5	74	260	83
C	0.65	61	200	71
D	1.4	86	347	78

* Paper presented during 45th midyear meeting, Chemical Specialties Manufacturers Association, Chicago, May 19, 1959.

TABLE 1.

Examples of deposit efficiencies in relation to particle size, output and nozzle orifice.

Prop. 11	*Prop. 12*	*Non-Volatile Content*	*Particle size*		*Discharge rate*	*Deposited at 12 inches*	*Diameter of nozzle orifice*
			MMD	*Max.*	*g./sec.*		
%	%	%	*1+*	*1+*		%	*inches*
0	25	75	96	224	0.85	78	
30	30	40	48		0.95	74	0.019
30	30	40	73		1.25	84	0.040
35	35	30	28	80	0.6	68	
40	30	30	35	85	0.85	56	0.019
40	30	30	49		1.4	90	0.040
42.5	42.5	15	19	60	1.1	23	0.019
42.5	42.5	15	39	124	2.0	71	0.040

o a vertical surface and settling out o a horizontal one is determined by spraying at a fixed distance on surfaces that can be weighed. The surface of the vertical plate must be similar in texture to the surface to be treated, since the texture of the surface influences the amount of spray that adheres. This surface must be large enough to cover the entire spray pattern and must not change weight with changes in humidity. The surface must be protected from cross air currents. This test is similar to the method proposed by the CSMA Particle Size Committee, except that the vertical and horizontal surfaces are weighed independently.

The sampling of the fine particles can be done by two methods: (a) collecting and weighing particles on a fine filter of known pore size; (b) by precipitating the particles with an electrical precipitator in a weighed tube. We use a commercial device, the Electrostatic Sampler Model F, manufactured by the Mine Safety Appliance Co. The sampler unit is provided with a small blower that draws 3 cubic feet (84.9 liters) of air per minute through the weighed tube. The breathing rate of an average man varies from seven liters (sitting) to 14 liters (walking 2 miles an hour) per minute. From the weight of material in the sampler it is possible to calculate the amount that might be inhaled by an operator applying the spray.

For evaluating and developing sprays we have found a large paper drum two feet in diameter and three feet long to be satisfactory. Vertical and horizontal test surfaces are set up within the drum, which is placed in a horizontal or vertical position depending on the desired distance from the sprayer to the target. Holes are cut in the drum for the sampler and air intake. The spray is applied to the target by reaching into the drum and releasing the valve of the dispenser, after which the cover is placed on the drum and the air sampler is started. When the sampling is finished, the plates and sampling tube are weighed. After several tests have been made at various distances, the optimum spraying distance can be determined as that which yields maximum uniform deposit on the target with minimum particles in the air. If unsatisfactory results are obtained, it will be necessary to change the ratio of ingredients, the propellants

(*Continued on Page* 70)

Table III. Deposit obtained when dispenser is held at various distances from target.

Formula	Discharge rate	Particle size		Per cent deposit (inches from source)
	g/sec	MMD μ	Max μ	
Aerosol G-845	2.4	28	100	83% at 3"; 81% at 6"; 74% at 9"; 40% at 12".
E	.65	61	200	71% at 12"; 36% at 24"
F	2.0	400	—	76% at 24"

Tabe IV. Typical pressurized insecticide spray formula* with three types of valve.

Type of Valve	Discharge rate	Particle Size		Per cent Deposit inches from nozzles		
	g/sec	MMD μ	Max μ	8	12	18
Mech. Break-up	0.8	74	125	68	57**	31
Aerosol-0.018 in. tip	1.0	170	298	81	83	62
Residue 0.025 in. tip	1.4	152	206	56+	66+	58

*25 per cent propellant 12, 50 per cent deodorized kerosene, 25 per cent solvent.

+Heavy spattering

**40 per cent on horizontal surface, 3 per cent collected from air.

Further Experiences with

DRY ICE AS AN AEROSOL PROPELLANT

By Dr. L. W. Haase*
Berlin, Germany

ALTHOUGH it is only two years since laboratory experiments showed the possibility of manufacturing and using transparent dry ice as a propellant for pressure packages, there are already a number of companies in a position to deliver up to 100,000 pressurizing pellets per day. The original manufacturing problems which seemed to present technical difficulties were solved in rapid fashion. Also satisfactorily disposed of were a number of problems in connection with transport and storage. New type insulated containers and deep-freeze boxes permit pellets to be stored safely over protracted periods and transported long distances, without substantial sublimation losses.

It was only to be expected that aerosol loaders in Europe (as well as those overseas) would examine this new propellant idea with great interest. Its simplicity of handling, use without expensive loading machinery and equipment, its low cost and high yield, make it an attractive item. For the first published articles on the subject (4), (5), (6), it has been emphasized that this transparent dry ice— purely on the basis of its physical properties—presents no competition to conventional aerosols, but instead may open up a large new field for pressure packaging a host of products which, because of chemical or technical problems, could *not* be packaged as conventional aerosols.

As the boundaries for its product application are still undefined and as the potential is so great, some sources have mistakenly regarded transparent dry ice as competition for such pressurizers as nitrogen, butane, propane and other such gases. In comparison with such gases, the transparent dry ice and the CO_2 it generates offer two important and decided advantages as a pressurizing medium, namely:

(1) In practically all liquids (even oils and petroleum products), CO_2 possesses a genuine or at least a substantial solubility factor, that is, the liquids absorb many times the amount of gas in the head space over the liquid level. Such liquids, pressurized with CO_2, have in themselves an almost inexhaustible gas reservoir, by reason of which the amount of gas (and therefore also the pressure above the liquid level) serves to evacuate the container with practically no pressure drop. This permits containers to be loaded with up to 85% product and completely emptied with a pressure loss of only approximately 0.3 atmospheres (about 5 p.s.i.) — an important factor in connection with discharge rate and atmospheric expansion effect.

(2) CO_2 has an excellent preservation effect. The moment transparent dry ice is released into the active product, it supplants all other gases present in the closed container, particularly the oxygen. At the same time, it creates in the head space a cushion of CO_2 which has the effect of immediately and permanently stabilizing all chemical, biological and micro-organism alterations. Vegetable and animal oils and certain other food products undergo no deleterious changes in a CO_2 atmosphere. In the products into which CO_2 has been released in closed containers, there is no oxidation, no shrinkage and no bacteria or fungus generation. With reference to only one field of possible application, this means that liquid cream, properly prepared, could be stored for protracted periods without refrigeration, that vegetable oils would not become rancid and employment of such a propellant would permit the use of oils in the whole cosmetic field without changes in stability or fragrance. The possible applications multiply as other fields are considered.

In addition to these two main points which distinguish the CO_2 process from that of the other compressible gases, it should also be noted that CO_2, because of its high absorption affinity with most products, differs radically from the liquefied gas packaging process in which, due to the solvent effect, a practically homogeneous mixture of product and propellant occurs. Most other compressible gases are not absorbed and serve only as pressurizing media. When product

* Presented at the first meeting of the European Federation of Aerosol Associations, Paris, France, on June 26, 1959.

Left: The dry ice loading process. The glass bottles at right are filled with product. Center, a tray of ice pellets which are placed in the bottles with tweezers before the valve is set in place. At left, fully loaded containers ready for valve crimping.

with an admixture of CO_2, is released into the atmosphere, there occurs, therefore, a certain amount of expansion and (to a certain degree) an aerosol effect.

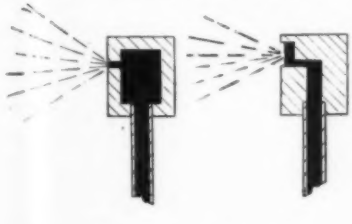
Experience over the past two years has demonstrated the importance of this "aerosol effect" for CO_2 pressurized products in the production of the valve and spray nozzle components. For liquid propellants, a mechanical break-up device in the spray nozzle is not required so long as the explosion at atmospheric pressure creates (according to product viscosity) the desired particle size. The rate of gasification is often regulated by an expansion chamber, built into the spray nozzle, which slows down the discharge rate, causing a pressure drop and partial expansion of the gas in the spray nozzle itself—before it hits the atmosphere. Only when the spray enters the free atmosphere and the pressure drops to atmospheric pressure does real gasification take place, producing, respectively, according to atmospheric temperature and product viscosity, an instantaneous or arrested explosion and a more or less fine or wet spray.

Despite the fact that the CO_2 absorbed into the product may amount to as much as 8% of its weight, the CO_2 process relies on a mechanical break-up device, sometimes supported by a solvent, to produce a desired spray pattern. It is therefore important with CO_2 pressures that there be no impediment or hindrance to a free discharge through the spray nozzle. On the contrary, it is desirable to accelerate this flow in order to avoid as much as possible any pressure drop prior to entrance into the free atmosphere. (Illustration 2).

Fortunately, a few courageous valve manufacturers *have* been willing to make the necessary minor changes in their valve parts and spray nozzles to accommodate this new pressure medium and permit commercial applications of the product. In view of the potential presented by this process, it is hoped that other valve manufacturers will follow this lead, permitting the field to expand. Until now, only restricted attention has been given to the matter of securing a free and unobstructed flow through the valve and spray nozzle, all research being in exactly the *opposite* direction. What has been accomplished is to mould spiral paths (into the exit orifice of the spray nozzle) which set up a circular or revolving motion, thereby accelerating the discharge rate. Through an improved entrance and exit for the product, both through the valve itself and through the spray nozzle, and unimpeded channels through which the material can flow with increasing velocity before final discharge, still better spray effects can be achieved with this CO_2 process. This has been proven by practical experiments. Doubtless, some mechanical improvements can also be made by means of changes in the type as well as the size of final exit orifice.

Theoretically, each type of product, regardless of the pressurizing process used, has its optimum orifice size. This would only lead to infinite variations and is also impractical since the chemist can accommodate his product to a few standard orifices. Here, it is only necessary that one be completely clear about the application of the pressurized product. Heretofore, not much attention has been given this matter, because the liquid propellants produce a spontaneous gasification which breaks up the product into fine particles, generally suitable for the purpose. Through the selection of appropriate liquefied propellants, or mixtures of various kinds, and consideration of the particular

Figures 1 and 2.—Cross-section of liquefied propellant spray head and (right) for transparent dry ice.



Figures 3 and 4.—Spray head with tangential whirling grooves; and spray head with whirling chamber (A—exhaust orifice vertical to surface, seen from above; and B—entrance orifices).

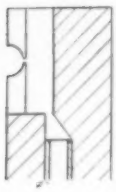


Figure 5.—Example of a technically correct whirling chamber with parallel openings.

applications involved at more or less standard temperatures and with more than the required explosive force being present, one could rely on a satisfactory particle size or spray pattern. As a general rule, this called for mixtures of active product and liquid propellant in a range varying from 30 to 90% in order to produce the desired effect. It is no wonder that with such heavy dilution of volatile active products and the discharge of only small quantities in short blasts, a fine particle size is realized.

The rule was proven by the few exceptions which showed that the solvent additive was insufficient to produce a dry enough spray or that the gasification rate of the solvent was too slow (and therefore the discharge pressure too low) for the quantity of product expelled with the propellant. Heretofore, little attention has been paid to this problem, for the question of whether a particular product was suitable for pressure package application has been mostly settled by whether or not it was soluble in the liquid gas. If not, extreme skepticism was expressed and the product put to one side.

With the CO_2 process, the situation is completely different, since this process is suitable for pressure packaging many products for which the liquid gases *cannot* be used. Especially important is a precise knowledge of the physical and chemical properties of the product to be packaged. If possible, the product should be able to be pressure packaged with CO_2 *without any additives*. Actual chemical composition plays a lesser role than a knowledge of viscosity, surface tension, specific gravity, internal friction and colloid structure.

In recent years, the chemical industry has brought out a host of products which we can collectively describe as "wetting agents" and "non-wetting agents." As these need be added only in very small amounts and, at least in technical products, do not change the chemistry, they are particularly suitable for adapting many products for pressure packaging. If the viscosity exceeds 2.0 to 2.5 cP (centipoises) it must be reduced by the addition of a proper solvent. It should be noted that there is no general rule here since the viscosity-solvent line cannot be charted. For example, with certain products a viscosity of 90 cP can be reduced to 3.5 cP by the addition of 30% alcohol, while with other products a viscosity of 3.5 cP is reduced only to 2.5 with 33-1/3% alcohol.

In connection with surface tension measurement, in this instance we can use the weight of a free falling drop. This weight should not exceed 50 mg for 20 drops in 30 seconds. As already observed, we can change the surface tension to that desired by minimal additions of appropriate wetting agents. Here again, there is no general rule. It can only be said that on the average something between 0.1 and 1% is sufficient.

On the basis of their colloid structure or emulsifying effect, a great many of such agents must be excluded, since their behavior creates water thinning effects and since they do not possess the properties of a true solvent. Although this phenomenon is well-known to chemists specializing in colloids (and therefore better qualified to work out problems for the pressurizing of such products with CO_2), it has not been a part of the chemical knowledge the aerosol industry has, as such, previously required.

When the CO_2 process was first announced some two years ago, it was erroneously concluded that only products of low viscosity and of a relatively light specific gravity might lend themselves for CO_2 pressurization. However, research since that time has shown that the boundaries actually are practically limitless. Floor wax, so viscous that flow from a container is achieved only by shaking, has now been successfully pressurized by CO_2 with no solvent whatsoever. Further, tar products and concentrated solutions of high viscosity, which have been successfully sprayed without solvents, show that, so far as these product characteristics are concerned, there are no difficulties.

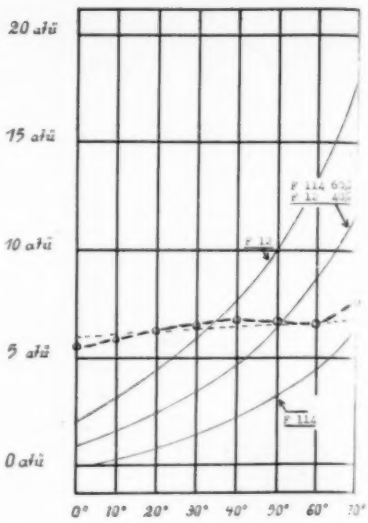


Figure 6. — Temperature-pressure table for liquefied gases (in solid lines); CO_2 is shown by the dotted line, and the dotted line with circles indicates CO_2 with an alcohol solvent.

In addition, no difficulties are encountered with the necessarily higher pressures which must be employed to spray such products. Naturally, thick-flowing products require higher original pressures to reach the flow velocity necessary to expel them through the dip tube, valve parts and nozzle orifices. For this purpose, CO_2 is an ideal pressurizing medium. Its expansion at a temperature increase of each degree centigrade amounts to only about 1/273 of its volume. That is, by temperature increases of 30 to 50°C.—and vice versa, down to 0°C., and lower—there is practically no pressure variation. (Illustration 6.) On Table 6, which shows the well-known pressure-temperature curves for some of the conventional fluorinated hydrocarbon propellants, two additional curves for CO_2 are imposed. The light broken line corresponds to its theoretical behavior according to gas law tables, while the heavier line, broken with circles, or-

(*Continued on Page* 68)

Kwik Kafe Fresh Coffee Concentrate has been introduced in aerosol form by Kwik Kafe Coffee Processors of America, Inc., Hatboro, Pa. The six-ounce Crown "Spra-tainer," equipped with a Precision nitrogen valve, contains enough concentrate for 20 to 25 cups of coffee.

Spray Starch is a new liquid laundry starch marketed by Cosmopolitan Commodities Co., Toledo, with a suggested retail price of 79 cents for a 16-ounce can. It comes in light-regular and heavy-semi-permanent strengths.

Obtundia First Aid Aerosol Spray is a new product being marketed by Otis Clapp & Son, Inc., Boston, pharmaceutical manufacturer, in both single containers and as part of a special burn kit. Product is in Wheaton plastic-coated bottle. It is being filled by Armstrong Laboratories. It may be used for open cuts, athlete's foot and other fungus infections, poison ivy, etc.

Bust Rust Penetrating Oil is being packaged and marketed in aerosol cans by Jet-Aer, Inc., of Paterson, N. J. Product is said to be non-flammable up to 300°F. Being sold in hardware, variety, and department stores, it is offered in a six-ounce American Can container for home use and a 12-ounce size for industrial use.

NEW PRODUCTS AND PACKAGES

D'Orsay Sales Co., New York, is using an uncoated serrated glass bottle manufactured by Foster-Forbes to package its new "cologne mist atomizer" in two sizes and in **Intoxication, Divine, Fantastique,** and **LeDandy** fragrances. Old Empire is the filler for the product, which is equipped with a B-8 mist-top valve and actuator by Valve Corp. of America and a gold-finished overcap by Britel Products.

Play Spray is believed to be the first little girl's kit of aerosol products. Each set, which will retail at $2.98 over toy counters, contains four aerosol products: "cologne foam," "beauty cream," "bubble bath," and "hair spray." Multiple Products Corp., New York, is the marketer.

A new line of farm implement spray enamels has been introduced by Krylon, Inc., Norristown, Pa., as an addition to the company's regular line of spray enamels. Included are International Harvester red, Case flambeau red, John Deere and Case green, John Deere yellow, Oliver green, Caterpillar yellow, Allis-Chalmers orange, Ford gray, and Minneapolis-Moline prairie gold. They are available in 16-ounce size at $1.79.

Duel, a combination disinfectant and deodorant for use in hospitals, factories and other institutions, is being marketed by National Laboratories, Inc., Toledo, an affiliate of Lehn & Fink. Lithographed 16-ounce container is by Continental Can. Product is described as bactericidal, fungicidal and tuberculocidal.

Aerosols and Food Technology

*By Dr. C. Giddey**
Battelle Memorial Institute
Geneva, Switzerland

THE aerosol is a development of bottle, tube, or jar packaging. It is suitable for the distribution of liquid, cream, or paste products.

Does the use of tubes or other open containers for these products present limitations? The answer is: yes, certainly. These limitations are: the risk of spoilage when the containers are open; deterioration due to contact with air and moisture; and, possibly equally important, an unpleasant appearance — the tubes are often deformed and the food products are partially solidified by desiccation. Aerosol packaging can very well solve these problems, and in doing so open up several possibilities. It could be used for standard food products, but could also facilitate the development of new commercial products.

The change from standard food packaging to aerosol packaging cannot be made without technical effort. The conception of new aerosol products requires thorough technological work, first in the laboratory, and then on a pilot scale. It would be a mistake, indeed, to assume that the problem consists only in the packaging question which could be solved solely by use of adequate machinery. Such a policy would be doomed to failure and would compromise the future of the aerosol for any particular product.

The physical structure of food products is of major importance. Let us take, for example, soup in the form of a thick cream contained in an aerosol container. I used the term "thick" in the scientific sense, i.e. meaning "having viscosity"; I should emphasize that the viscosity is defined as the strength needed to displace the surface of 1 ccm separated from 1 cm of a fixed surface. The product is introduced between the two surfaces. The viscosity unit is the centipoise, which corresponds to a strength of 1 gr for a surface displacement of 1 cm per second. In many cases the viscosity changes as a function of the speed of displacement, i.e. the product will be more or less viscous according to the speed at which it is driven out of the aerosol valve. In this connection there are three points of interest:

a) The viscosity is independent of the mechanical work.
b) The viscosity decreases due to the effect of the mechanical work (thixotropy).
c) The viscosity increases due to the effect of the mechanical work rheopexy).

The use of tube packaging is preferred for thixotropic products. With such products, the rate of flow through the axis is regular. In the case of aerosol packaging, however, the problem is somewhat different. With aerosol, the thixotropic products unfortunately tend to stick to the wall of the container. Indeed, since no mechanical work whatever disturbs the mass of the product in the container, the substance remains viscous, whereas it becomes fluid when passing through the valve. Consequently, cavitation phenomena are often observed. Despite the fact that the product has no special affinity to the wall of the container, it does not easily drop to the bottom. The ideal would be to have a product with constant viscosity (case a), or possibly a rheopectic product. The rate of flow through the valve would be slow, but the entire mass in the container would be able to sink to the bottom easily.

The properties discussed above are closely dependent on the thickening agent, which helps to confer the suitable physical structure to the food product. I propose first to summarize the principal types of thickening agents. Indeed, the future of aerosol foods is closely related to the choice of these agents.

The selection of a thickening agent is often a difficult problem. However, the chances of success are increased by the large number of these substances existing. Let us take, for example, seaweed hydrocolloids (alginate, carrageen, and agar-agar). When considering the use of such products, it is necessary to take the following factors into account:

—Heat resistance (e.g. during sterilization)
—Effect of salts
—Wettability, etc.

Hydrocolloids are often sensitive to hydrolytic splitting, related to the pH and depending on the temperature. Sometimes the sensitivity rate is so high that all sterilization techniques must be avoided. The salt effect, which modifies the viscosity, is of great importance. Some salts (cation) increase the viscosity, as for example in the case of calcium ions for alginates and potassium ions for carrageenates; modifications of viscosity can also take place in the re-

*Presented at the second annual meeting of the International Aerosol Association in Zurich on May 8, 1959.

The Magic Touch of

Aerosol Packaging

can give your products "feminine appeal"

If you have a woman's product, and want to gain entry to milady's chamber for it, consider the advantages of aerosol packaging. The convenience. The glamorous new container shapes, colors and textures. And the high state of development of the aerosol "art."

Aerosol packaging does seem to have a magic touch in helping to sell a woman's product. Hair sprays are still the largest selling single aerosol product group—115 million units in 1958*. Aerosol colognes and perfumes have proved phenomenal sellers—shooting up from 5.4 million units as recently as 1955 to 28 million units in 1958*. Aerosol hand lotions and creams are showing a similar increase, as are aerosol personal deodorants. If you have a product in any of these fields—or a related one—you should be considering aerosol packaging *right now!*

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General Chemical manufactures the right propellant for every cosmetic aerosol need under its trade name "Genetron." These propellants can give your product exactly the right "push" your aerosol formulation requires.

As a leading supplier of aerosol propellants, we will be glad to help you get started in aerosols. We will supply you with market information and technical data. We can tell you about promising new types of aerosol formulations developed in our laboratories. And we can give you information on how contract fillers can help you, from test marketing right through to full commercial production. The fact is, through the use of contract fillers you can get into aerosols without investing a cent in special equipment or personnel!

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verse sense (salt effect on agar-agar).

The decreased viscosity often observed as a result of using sodium chloride increases the difficulties in the use of thickening agents in salt products (soups, sauces, gravies). The use of high concentrations of a thickening agent can be considered, but in this case the retail price of the product would be too high. In fact, it is often easier to obtain a thick structure in salt products by the use of starch substances. Here again, it is important to discover the best physical conditions for doing this. The aerosol product should maintain a stable physical structure for several months, i.e. it should have:

—constant viscosity,
—no sedimentation, and
—no clogging tendency.

The starch must not retrograde. It is well known that starches undergo a kind of recrystallization which promotes their insolubility in water, but there are fortunately special starches available, such as those obtained from selected plants (e.g. waxy-maize or waxy-millet) and composed essentially of amylopectine molecules.

Apart from these standard thickening agents, there are other techniques enabling viscous structures to be obtained. One of these is the possibility of reaction between proteins and carrageens: linkage of these two types of molecules considerably increases the viscosity and in many cases also the gel formation. Another possibility is to bring about reactions between large molecules and inorganic salts, for instance a reaction of phosphoric acid and casein. These reactions normally take place at high temperatures, so that the food products would have to be cooked.

We occasionally encounter problems of stability and homogeneity of the mixtures. When we speak of "stabilizing agents," we think of the numerous natural or synthetic tensioactive substances. Unfortunately, many of the really efficacious tensioactive substances cannot be used in foods because they are forbidden by food regulations (Tween, Span, etc.). Other natural products which are permitted are mainly suitable for household use or must be consumed within a short lapse of time (e.g. gelatin, albumen, etc.). As a result of this limitation, the use of physical means is often preferred, e.g. homogenization (for milk and other dairy products). However, it must be noted here that purely physical means of sterilization are often unsatisfactory without the aid of active agents; moreover, the viscous structures are often sensitive to the homogenization process: thickening agents used for products in the form of creams or pastes lose their viscous properties through homogenization. As a result, it is often necessary for part of the pre-homogenized product to be mixed with the viscous phase. With starch as thickening agent, for example, the ingredients are homogenized and the gelling mass prepared separately, the two being mixed afterwards.

A difficulty arising from the principle of aerosol itself is the risk of the external pipe of the valve being blocked, especially when the product is used only occasionally. This is due primarly to drying of the product. The use of viscous solutions or pastes diminishes the risk, provided that no syneresis effect promotes separation of the liquid phase of the gel itself. Thus it is clear that it would be advantageous, in aerosol technology, to use viscous products instead of liquid ones.

In order to decrease the syneresis effect, the use of mixed gel containing two or more thickening agents (such as, for example, mixtures of alginate and agar, or alginate and carrageen), is recommended. It is also possible to increase the water-binding properties, thus decreasing the risk of evaporation, thanks to the use of water-binding agents, such as polyphosphates, pyrophosphates, or products like Sorbitol, glycerol, etc.

As I have already mentioned, aerosol packaging opens up new possibilities in the field of foods, because it ensures efficient protection against outside spoilage, oxidation, off-flavors, etc. Thus it is possible to distribute substances which were formerly presented in the form of powders or dehydrated packages in the form of cream, paste, or fluids. I should like to suggest, for example, spices, tea, coffee, cocoa, vegetables, soups, etc. Here, too, the fundamental technical differences between aerosol food and standard products can clearly be seen. In the case of powder products, the problem of wettability and rehydration is predominant: powder for soup, for example, contains starches; these raw starches swell during cooking. For liquid concentrates of soup in aerosol cans, other requirements are necessary. The viscosity which the preparation must give to the boiling water added should come directly from its own viscosity, and not from in situ swelling of the starch.

We now enter on still another consideration. With aerosol products, there are two sides to be considered. They should be able to offer food products of higher quality, thanks to the fact that it is possible to avoid drying processes. I refer, in this connection, to vegetable homogenizates, in which the absence of drying processes decreases the loss of volatile flavors and the production of off-flavors characteristic of all products in powder-form (often named "hay-like" flavors). On the other hand, the use of aerosol presents certain difficulties which are summarized by the general term "denaturation reactions." What are they?

The first to be mentioned is the well-known "Maillard reaction," or non-enzymatic browning reaction. These reactions consist of interactions between proteins and amino acids on the one hand, and of reducing sugars or organic acids on the other. The reactions between proteins and reducing sugars are probably the best known; their first step is characterized by a reaction between the reducing group of sugars and the amino-group of proteins. The following steps produce very complex substances, named melamines; however, I have neither the space nor the wish to discuss them here in greater detail. I should only like to mention that melamine can seriously impair the

(*Continued on Page 75*)

Strong Publicity Program Slated for Coming Year

*By Norman Odell**

Norman Odell Associates
New York, New York

THE aerosol industry has such a bright future that I am very glad to be back in it. We are gratified that the Aerosol Division Publicity Committee has the confidence in our new organizaton, and selected us to work with the industry in promoting aerosol packaged products.

We have all heard it said many times that the aerosol industry has had a fantastic growth. I would like to make it even stronger and say it is *unique* in the annals of American industry.

There are good reasons for this, and I think they are worth citing as the industry embarks on the second leg of its climb to becoming a one billion dollar business.

The important elements of this growth are:

(1) a willingness, and know-how, in all segments of the industry to tackle research and development projects, no matter how tough;
(2) a healthy exchange of technical information among manufacturers and marketers;
(3) effective consumer advertising by marketers;
(4) sound trade advertising by component manufacturers; and
(5) an industry-wide publicity program.

No one can say how much each of these elements has contributed to the acceptance of hundreds of aerosol-packaged products. But, I think we can all agree, that if any of these were discontinued the industry growth rate *would be* adversely affected.

On the other hand, if they continue working together, to add to the momentum already generated, this industry may be very much closer to the one billion dollar annual sales level than some of you think.

In planning the publicity-promotion program for 1959-60, we have tried to analyze exactly where efforts are most needed, and how the budget can be used to greatest advantage.

There are indications that the *novelty* appeal of aerosols, while still considerable, is becoming less and less of a compulsion for consumers to select an aerosol packaged product from the retailer's shelf, in preference to the same product conventionally packaged. Consequently, we need more help from retailers in "pushing" the variety of aerosols that they stock.

If we expect this kind of help from retailers, we must provide them with more information about the advantages, correct use, expected results, and profitability of aerosols, so that they can and will sell them persuasively.

We can take a cue from the increasing success of door-to-door sales of aerosols. If the product can be demonstrated and sold in front of the customer, the inherent advantages of the "aerosol package" are immediately obvious.

To meet this problem we plan to put more emphasis on publicity directed to retailers, to inform them how to display, demonstrate and sell aerosols through the "convenience-speed-economy" appeal.

In the first two years of the program, publicity on aerosol packaging was directed almost exclusively to consumers, through newspapers, wire services, national magazines, and television film. In the coming 12 months we plan to devote about 30% of our publicity efforts to the retail trade and the publications serving retailers.

Publicity aimed at the mass consumer public will still receive 70% of our efforts, for we must maintain interest and demand for aerosol packaged products among housewives and homemakers.

As part of our publicity campaign to retailers we are planning a special aerosol sales promotion in an actual supermarket.

While we would like to conduct several such promotions — in drug, hardware, and department stores as well—we must be realistic about the use of available funds. But we expect valuable results from the supermarket promotion. Here is the way it will work:

We will secure cooperation of the manager of a large, modern supermarket, in some major metropolitan area yet to be selected, and stage a one-week promotion on all the aerosol products normally handled by the store.

These aerosols will be attractively displayed in a special booth, prominently placed near the supermarket window, and they will be demonstrated for customers two or three times each day by an attractive home-economist-type personality.

The demonstrator will show a variety of aerosols in use, explain principles in simple terms, and stress aerosol advantages in modern home management.

An easy-to-read, promotional pamphlet on aerosols will be supplied as a hand-out to shoppers.

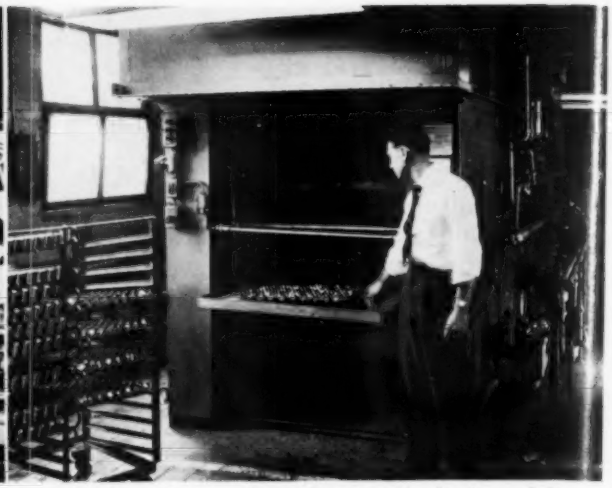
The store management can sponsor a lucky number drawing, the winner or winners to receive $50 worth of aerosol products at the end of the week.

On behalf of the Aerosol Division of CSMA, we will work with the cooperating supermarket, provide manpower, guidance and assistance in staging the promotion, and in pub-

(*Continued on Page* 67)

* Presented before the Aerosol Division of the Chemical Specialties Manufacturers Association in Chicago on May 20, 1959.

The initial operation is performed on the eyelet machine, which begins with a roll of steel and punches out each cap.



One important operation is the automatic cleaning and degreasing. Heat and pressure remove lubricant from the metal.

Metal Fabrications

the luxury aerosol container "comes of age" . . .

PROBABLY the key to the tremendous success enjoyed by the aerosol package in the perfume and cologne field has been the improvement and refinement of aerosol container styling. Since the conventional can is obviously not the ideal vehicle for a small quantity high-priced item like perfume, and since the coated and uncoated bottle is sometimes limiting (as to decorative possibilities) in the small sizes, the obvious need for the aerosol industry's expansion into the perfume field was a small, brilliantly decorated one-piece container in which the valve is combined with the container.

One of the pioneers in this type of development, and one of the most versatile innovators is Metal Fabrications Co., Waterbury, Conn. Long specialists in custom metal work, this company has been working with leading small container manufacturers (such as Peerless Tube) and with a host of major valve manufacturers to produce a series of aerosol "triumphs" in the field.

Actually though, Metal Fabrications

(*Continued on Page 69*)

The metallic lacquer is baked on in huge ovens. To minimize damage in handling, the caps are kept in small racks.

White-gloved women take the caps off the spray lacquer belt and place them on racks for final baking and polishing.

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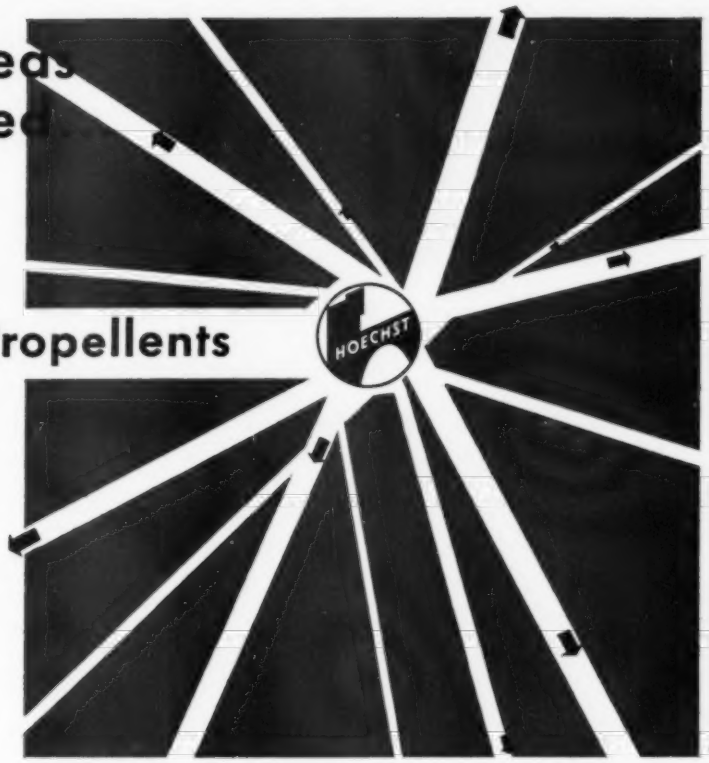

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Frigen 21 A Monofluorodichloromethane $CHFCl_2$

Frigen 22 A Difluoromonochloroethane CHF_2Cl

Frigen 113 A 1,2,2,-Trifluorotrichloroethane $CFCl_2$-CF_2Cl

Frigen 114 A 1,1,2,2,-Tetrafluorodichloroethane CF_2Cl-CF_2Cl

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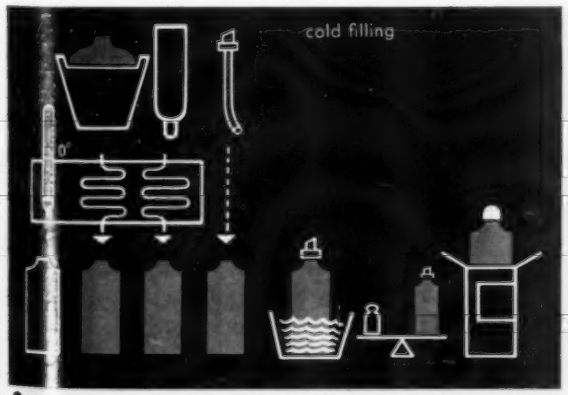

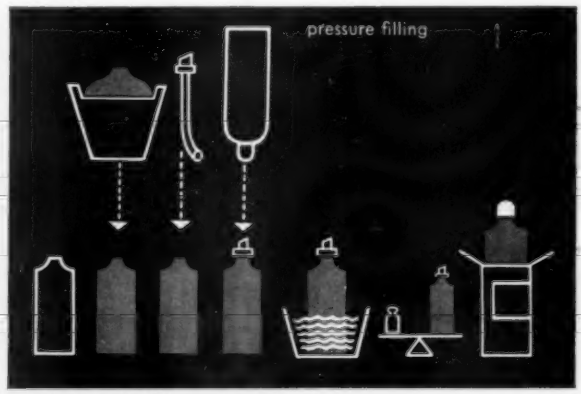

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Aerosol Hair Sprays

FDA Reports on Extensive Studies Which Demonstrated Safety to Consumer

*By J. H. Draize, A. A. Nelson, S. H. Newburger, and E. A. Kelley**

Division of Pharmacology and Cosmetics
Bureau of Biological and Physical Sciences
Food and Drug Administration
U. S. Department of Health, Education, and Welfare
Washington, D. C.

BERGMANN (1) *et al* have recently reported on two clinical cases of pulmonary thesaurosis, suggesting that these may have resulted from inhalation of spray during use of aerosol hair spray preparations. In addition these authors stated that the subcutaneous injection in guinea pigs of the solid nonvolatile residue of a hair-spray formulation resulted in the deposition of cytoplasmic granules in the reticuloendothelial cells of the liver and spleen. This deposition was considered the result of characteristic biological reactions known to be associated with the parenteral introduction of natural and synthetic resins. These findings indicated to the authors that the human lesions which they reported were due to the inhalation of macromolecular substances contained in the hair spray. More recently, Calandra (2) and Kay reported on inhalation exposures to two types of aerosol hair spray preparations on guinea pigs, three times daily for periods varying from 45-90 days. They failed to obtain evidence to substantiate the findings of pulmonary thesaurosis in their experimental subjects.

The report of potential dangers in the use of aerosol hair sprays led us to a comprehensive investigation of these products. A survey of aerosol hair sprays currently in use indicated that the majority of these products may be classified for our purposes into six types on the basis of their hair fixative or film-forming component.

These six types are:

1—polyvinylpyrrolidone (PVP);

2—a copolymer of polyvinylpyrrolidone and polyvinyl acetate (PVP-PVA);

3—shellac;

4—dimethyl hydantoin - formalde - hyde resin (DMHF);

5—modified polyacrylic acid resin (MPA); and

6—lanolin.

Lanolin is not in a strict sense a hair-fixative film, but is rather an oily or unctuous hair dressing dispensed by means of aerosol propellants.

A representative sample of each of the six types of sprays was selected for our investigational work. The percentage of the non-volatile components (heating for 2 hours at 105°C) of each sample, representing the given types used in our investigations, is listed in Table I. At the outset of these investigations it was realized that data on the physical characteristics of the atomized sprays would be necessary in an appraisal of their potential toxicity and safety for use. Such studies should include the determination of particle size, their distribution, concentration of material in atmosphere, as well as rate of settling from the atmosphere. The physical data on the sprays as atomized from the pressurized containers were obtained by personnel and special equipment of Agricultural Research Center, United States Department of Agriculture, Beltsville, Maryland.**

TABLE I.
Nonvolatile matter in hair spray types.

Sample Hair Spray Type	*Non-Volatile Matter per cent*
PVP	1.41
PVP-PVA	1.72
Shellac	1.36
DMHF	1.6
Modified Polyacrylic Acid	1.41
Lanolin	4.37

The entire range of size of particles and percentage distribution according to their size are given in Table II. These data are analyzed in the graph in Fig. 1. The results are expressed as the average for all six sample "types." This was considered permissible since the distribution of the size of the unimpinged particles did not vary by more than 10% from one sample type to another. The DMHF, and lanolin-type sprays did exhibit slightly larger particles although well within the 10% variation. Approximately 50% of the particle weight represented solvent.

Particle sizes varied from 1 micron or less to 30 microns in diameter,

* Presented at the May 14, 1958, meeting of the Scientific Section of the Toilet Goods Association at the Waldorf-Astoria Hotel, New York.

** We wish to express our gratitude to Dr. R. A. Fulton and Mr. A. H. Yeomans of ARS, USDA for their generous help

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All these products go to market dressed in the finest . . . Canco's famous Aerosol Containers!

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ith a mass median diameter of 8.5 icrons. It is significant that 65 per nt by weight of the unimpinged ray were particles in the range of and less microns in diameter. Parles of a size of 3 microns and less n readily reach the alveoli of the ng, and those in the range of 3-10 crons do so less readily, whereas rticles larger than 10 microns are ite efficiently removed by the ciliar apparatus of the respiratory ct (3).

Human Exposures

Women volunteers were used to ain data on the six types of rays. Prior to the experimental exsures, spray-release time was determined on a number of women during a normal hair-spraying operation. The average spray-release time was found to be 10 seconds. In order to obtain additional data to cover cases of exaggerated or excessive use, additional exposures involving 30-second spray releases were included. Each subject was, therefore, exposed to a 10 and a 30 second release of the respective spray and following each such release remained in the sprayed atmosphere in a closed cubicle for five additional minutes. The cubicle measured 5′ x 6′ x 6′ (180 cu. ft.), that is a small confined room, which might be comparable in size to a small bath or powder room.

Each subject was sprayed at a distance as indicated in label directions for use on the container. If no directions for spraying were furnished, the subject was instructed to spray half the time at a distance of 6 inches, and the other half at 12 inches from the hair. The room was thoroughly aired after each test. A Mine Safety Appliance Company's Electrostatic Model F Sampler was used to sample the atmosphere. It is equipped with an aluminum tube which was weighed before and after collection of sample. The sampling tube intake was placed 5 feet above the floor and approximately 1 foot in front of the subject's head. The air sampler collected particles from one-twelfth (15 cu. ft.) of the air volume in the room during the 5-minute sampling time. The tube was weighed 5 to 10 minutes after collection, and, with the exception of the lanolin type, the deposit was found to consist of dry powder.

The normal adult at rest has a respiratory rate of approximately 16 per minute. There are approximately 500 cc. of tidal air involved in each inspiration. However, all of this volume of tidal air does not reach the alveoli of the lung, since approximately 150 cc. of this total is designated as "dead air" and occupies the nasal cavity, larynx, trachea and bronchial tree. Therefore, only 350 cc. of new tidal air reaches the alveoli per inspiration (4). This permits a calculation of total inspired

(*Continued on Page* 70)

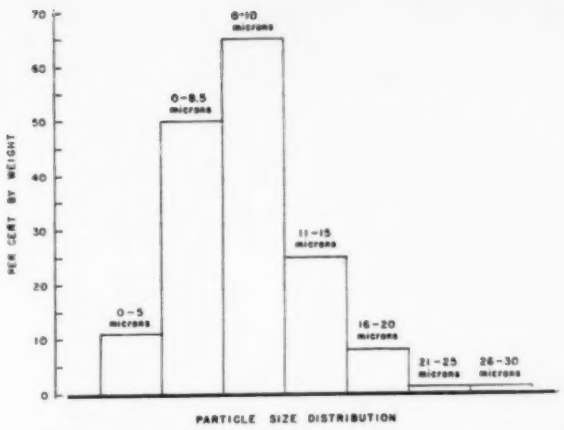

Figure 1—Distribution of particle size in unimpinged hair spray.

TABLE II.
Distribution of particle size in unimpinged hair spray.

PARTICLE SIZE DISTRIBUTION	
DIAMETER microns	*WEIGHT % accumulative*
1 and less	0.1
2	0.5
3	2
4	5
5	11
6	19
7	35
8	45
9	55
0	65
5	90
0	98
5	99
0	100

TABLE III.

Weight of the nonvolatile portion of the various sprays in the atmosphere following 10 seconds, and 30 seconds treatment of hair.

HUMAN EXPOSURES TO HAIR SPRAYS

SAMPLE "TYPE"	SPRAY RELEASED		NON-VOLATILE SPRAY	
			in 15 cu. ft. of air	inspired in 5 min. exposure
	sec.	gm.	gm.	gm.
PVP	10	12.0	0.0020	0.00013
	30	35.7	0.0050	0.00033
PVP-PVA	10	12.0	0.0020	0.00013
	30	27.0	0.0060	0.0004
Shellac	10	8.8	0.0024	0.00016
	30	22.5	0.0038	0.0002
DMHF	10	3.5	0.0005	0.00003
	30	13.7	0.0042	0.0003
Modified Polyacrylic Acid	10	8.7	0.0045	0.0003
	30	12.3	0.0090	0.0006
Lanolin	10	12.5	0.0067	0.0004
	30	35.6	0.0310	0.002

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determination of

The Curl Strength of Tresses

treated with hair sprays

By E. J. Stavrakas, M. M. Platt and W. J. Hamburger†
Fabric Research Laboratories, Inc.
Dedham, Mass.

THIS paper is essentially a progress report in which is presented a portion of several research studies which have been sponsored by the Warner-Lambert Research Institute on a continuing basis for a period of ten years. The phase of the research which will be discussed herein deals with the measurement of the strength of a curl which has been imparted to a tress by some home treatment.

It would seem appropriate for an industry which supplies home treatments for the transformation of straight or unruly hair into well ordered curls or waves, to have an objective technique available for quantifying and evaluating the efficacy of its treatments. The technique described in this paper is a suggested approach to this end.

The parameter selected as a criterion of treatment effectiveness has been termed the "Curl Strength Index" and is referred to by the letter K. It is essentially a measurement of the energy required for a longitudinal force to straighten out the curl in a tress of treated hair. Two considerations recommended this parameter; the first consideration is that it is a relatively simple test to perform, and the second is based on the contention that the ability of a curl to resist deformation resulting from the application of external longitudinal forces is an important performance characteristic.

† Abstracted from a paper presented at the May 14, 1959, meeting of the Scientific Section of the Toilet Goods Association in New York and published in the "Proceedings" of the Section.

Three inter-related aspects of the work which will be discussed herein are:

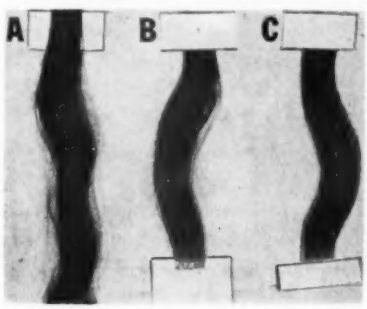
1—Description of the technique developed to characterize curl strength, together with some considerations of the statistics involved in assessing its reliability.

2—Some preliminary results on the application of the technique for the evaluation of the effects on curl strength of selected waving lotions.

3—Results of some selected experiments on the stability of curl strength under varied environmental exposure.

Preparation of Tresses

Perhaps the most direct means of describing the preparation of the sample tresses is to illustrate the assembly



at several stages. In photo above are three such illustrations. Tress A is shown cemented (Duco Cement®) to a cardboard tab, which measures 2 inches in length and is 1 inch wide. Tress B is shown with the upper portion cemented between two cardboard tabs, and the lower end attached to a piece of waterproof adhesive tape. This lower part of the tress has also been treated with a solution of Parlon® in $CHCl_3$ which acts as a protective coating to prevent the chemical treatments from loosening the bond between the hair and the adhesive tape. Across the center of the tape lies a glass tubing (3" long, 0.20 O.D.) which serves as a mandrel for winding the tress into a curl following the various treatments. The completed tress, C, is shown with the adhesive tape folded over on itself, thereby covering the glass tube and binding the lower portion of the tress on both sides.

In the completed tress, the hair between the cardboard and the adhesive tape is approximately six inches long and one inch wide. The weight of hair available for waving was generally between 1.5 and 2.0 grams. All of the hair utilized in this work was thoroughly shampooed after it had been cemented in the cardboard tabs, and the tresses were wet combed straight and trimmed to six and one quarter inches prior to mounting in the adhesive tape.

The tresses used in the phase of this study concerned with hair sprays had been water waved by the procedure described in footnote.* The

*The prepared tress was thoroughly wet out in water at room temperature. A 50 gram weight was clamped to the cardboard tab to serve as a tension control. Holding the tress vertically, so that the 50 gram weight was suspended from the lower tab, the hair was wound on the tape covered glass tube. The wound tress was fastened to the glass tube with bobby pins and allowed to air dry overnight. It was then dried thoroughly in an electric dryer, unwound, and conditioned in a standard atmosphere (65% R.H., 70°F.) for a period of 24 hours prior to testing.

sprays were used at various times, which will be delineated in the appropriate section of the paper. However, the actual application of the spray was the same at each time of application. The spray was applied by holding the tress vertically at arm's length and exposing it to three passes of the spray.

Determination of Curl Strength Index—K

Curl strength measurements were performed on an Instron Tensile Tester which is a constant rate of strain machine with a load-measuring system comprised of a bonded strain gage-type load cell with its amplifying equipment. An integrator was coupled to the Instron Tester to facilitate the determination of the area under the load-extension curve. This area is used to calculate the energy expended by a longitudinal force in straightening the tress.

The tresses were mounted in the Instron test jaws in the following manner: the cardboard tab was placed in the upper jaw so that the junction of the hair and cardboard was flush with the lower edge of the jaw; with the tress suspended from the upper jaw (tensioned by the weight of the glass tubing and tape) the lower jaw is positioned so that the junction of the hair and the tape is flush with the upper edge of the jaw. To avoid gripping the glass tube in the lower jaw, an Esterbrook #40 paper clamp was utilized in place of the normal flat jaw.

At this point the distance between the test jaws is considered the curled length of the tress. The straightened length of the tress is the sum of the extension necessary to straighten the curl and the curled length of the tress. This extension is obtained from the load-extension diagram (Figure 2) which is autographically produced by the Instron recorder during the curl pull-out test.

The "Curl Strength Index", K, is simply the energy obtained from the load-extension diagram divided by the straightened length of the tress, in order to normalize the index for different tress lengths.

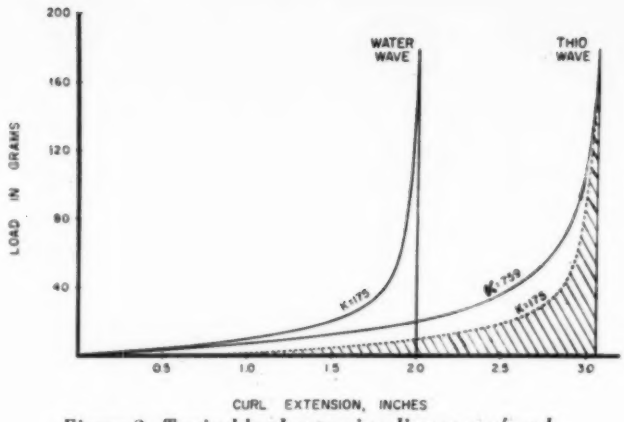


Figure 2—Typical load-extension diagrams of curl strength tests.

The "Curl Strength Index", K, is simply the energy obtained from the load-extension diagram divided by the straightened length of the tress, in order to normalize the index for different tress lengths.

Preliminary Investigation of the Curl Strength Index (K)

In this phase of the work two types of hair sprays A and B representative of the principal types of these available commercially were used. To determine the effect of hair sprays on the curl strength index of water waved tresses, two methods of spraying the tresses were utilized. In the first method, the tresses were sprayed approximately 20 minutes prior to testing, while in the second method the tresses were sprayed immediately after unwinding, allowed to condition for 24 hours, and sprayed again approximately 20 minutes prior to testing. In this way it was hoped that some measure of the cumulative effect of repeated spraying would be obtained.

The pertinent data are listed in Table I. Admittedly, these data can only be considered as a cursory study of the effect of hair sprays on this property of curl strength. Nevertheless, a number of interesting inferences may be drawn from an examination of the data. It is eminently clear that none of the hair spray treatments yielded levels of (K) comparable to the level attained with the regular thioglycolic acid treatments. While there is some evidence that type B hair spray is superior to type A the limited number of tresses examined and the high variability encountered at these low levels of (K) preclude any statistical confirmation that these differences are actually significant. Despite the limitations of the size of the experiment it seems reasonable to conclude that there is no difference between the results outlined by the two methods of spraying, and conse-

(*Continued on Page 66*)

TABLE I

Effect of Hair Sprays on Curl Strength Index (K)

Type of Spray	Method of* Spraying	No. of tresses	Average (K)—grams Water Wave Control	After Spraying	% Chang in (K)
A	I	4	81	110	+39
B	I	4	109	203	+84
A	II	4	155	233	+44
B	II	3	127	243	+93

*I—sprayed approximately 20 minutes before testing.
II—sprayed immediately after unwinding, conditioned for 24 hours, and sprayed again approximately 20 minutes before testing.

In this column important aerosol subjects appearing in other periodicals (both domestic and foreign) will be reviewed and summarized. It is felt that this service will enable the reader to keep abreast of most of the significant contemporary articles on the industry, even though they may appear in other periodicals. Since there is a chance that some pertinent articles may be overlooked, it will be helpful if readers will call our attention to any they judge important enough to review.—*The Editor.*

AEROSOLS in review

Aerosol Horns Given "Rave" in N. Y. Times

AN EXCELLENT article on liquefied gas horn devices, which are currently becoming increasingly popular in yachting circles, is published in the sports section of the *New York Times* for Sunday, May 31. Written by Clarence E. Lovejoy, a *Times* staffman, the article reports some highly pertinent facts on the efficiency of the horns:

"It emits a deep-throated blast rated at 110-115 decibels. That's loud enough to be heard at least 1,000 feet away in even the densest fog and as much as a mile away over water on a clear day.

". . . The usual one-pound charge of the chemical provides enough power to emit a continuous 12-minute blast. Under maritime rules of the road, which require two two-second blasts per minute as a navigational warning during fog, that means the charge is enough for three-hours' operation as a fog horn. They can also be 'reactivated' by replacing the self-puncturing container of liquefied gas.

"Larger sizes of horns also are available, including one with a 'glass eye' built into the front of the container. This permits the user to tell at a glance when the gas power is running low and requires replacement. Charged with 25 ounces of Freon, this particular unit will emit a continuous 40-minute blast or as many as 5,000 short blasts.

"The big advantage of the warning horn, aside from the bull voice and light weight, is the safety factor in case of an engine or electrical system breakdown aboard the boat. They do not require an external source of power, are entirely self-contained, and range in price from $10 to $25 for the small hand-held type."

The article concludes with a listing of the manufacturers of such warning devices.

•

A BRIEF but informative article describing the automatic aluminum container-making line at John Dale (Bury) Ltd., is one of the features of the May issue of *Manufacturing Chemist*, British trade and technical periodical. The main part of the line, located on the ground floor of Dale's factory, consists of:

1. The press, which extrudes can bodies.
2. The trimming machine, which removes surplus aluminum.
3. The flange and beading machine, which sizes, flanges, and beads the can to the customer's requirements.

"These operations are synchronized by conveyors to enable the can to move at a uniform speed to the next operation, degreasing, which takes place on the first floor. Conveyance to the degreaser is by automatic feed from the beading machine to biplanar chain. The latter is 110 feet long and makes a complete cycle from the flanging through the degreasing plant, returning empty to flanging plant on the ground floor, where it is reloaded with cans for degreasing.

"After degreasing, the cans are offloaded onto another conveyor feeding an automatic enamelling or base coating machine. At this conveyor stage, the cans, if necessary, can be shed to an internal coating line for araldite coating and stoving, and then returned to the enamel coating machine. This arrangement is necessary due to the wide variation in stoving temperature required between internal coating materials and epikote enamels used for external decoration.

"After the external enamel coating has been applied automatically, the cans are conveyed through electric infra-red stoving ovens to enable the first part of the enamel curing operation to take effect. The cans are then ready to receive the necessary print decoration, which is done by four-color offset printing machines. The cans are automatically transferred from the oven chain conveyor to the print turret which rotates, synchronizing with the first conveyor. Following the actual printing operation the cans are given a final stoving to dry the printing ink, and finally cure the base coat enamel.

"The cans are then automatically transferred from the second oven chain conveyor to a further conveyor feeding and seaming machine, which as the final operation, seams a metal base on the flange of the aluminum can."

•

AN excellent article on the crimping of aluminum, tin-plate and other metal containers is carried in the April issue of *Parfumerie, Cos-*

She chooses the product that's pleasant to use!

F*ragrance can make the difference.* A successful product fragrance must be subdued and pleasing, well balanced with the product's chemical characteristics . . . a fragrance that quietly and consistently tells *your* story of quality, cleanliness, effectiveness.

PARTICULARLY AEROSOLS

With pressure-packed items, fragrance and odor control are particularly important, due to the excessive amplification of odor through the fine dispersion of product in use. Perfuming an aerosol product is easy when you know how . . . We have the "know-how" and the facilities to do an effective job for you.

We would like the opportunity to give your new product the effective sales appeal of the *right* fragrance.

CUSTOM MADE FRAGRANCES FOR AEROSOLS, WAXES, POLISHES, SOAPS, DETERGENTS, INSECTICIDES AND ALL CHEMICAL SPECIALTIES.

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Leading Creators and Manufacturers in the World of Fragrance

metique, Savons, leading French-language trade periodical dealing with the aerosol industry. Written by M. Berion, the three-page article first discusses the source of each type of container, and then goes into a more detailed summary of some of the necessary precautions that must be taken in handling them.

•

TELEVISION is becoming more and more significant in aerosol product advertising, according to a brand-by-brand analysis of 1958 consumer advertising expenditures for the drug, toiletries, and sundries trade reported in the June 15 issue of *Drug Trade News.* Data for the study's magazine and newspaper supplement figures were based on the Publishers Information Bureau. Farm magazine figures came from the Farm Publications Reports, and figures from newspapers from the Bureau of Advertising of the American Newspaper Publishers Association. Finally, expenditures for spot television were reported by the Television Bureau of Advertising. *Drug Trade News* reports that many figures came directly from the advertisers themselves. (Figures listed below.)

•

A SURVEY of the activities of the various aerosol firms in Bridgeport appears in the May 3 issue of the *Bridgeport Sunday Post.* Though sometimes the facts are slightly distorted (Connecticut Chemical Research it still listed as a separate company) the article is valuable in that it gives a good capsule picture of the diversification of the industry in the ity that lays legitimate claim to being the "birthplace" of the commercial erosol.

"If any one component of an erosol container is typically the pro luct of Bridgeport's aerosol research,' the article says, "it is the metered v lve. At one time the valve's capacity was limited. It was necessary for the rod-uct manufacturer who wished t go into aerosol packaging to adap his product to fit a valve which pern itted little flexibility in requirements But today, Bridgeport aerosol valves have altered the situation.

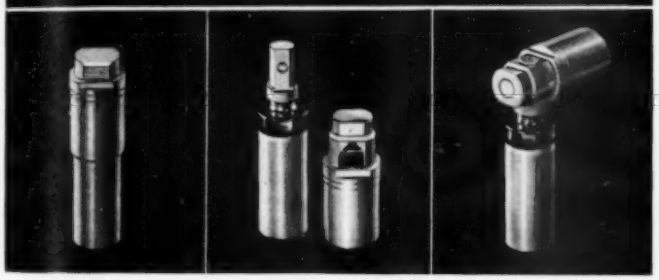
"Instead of the product being tailored to fit the valve, the valve is being fitted to the product. As a result, aerosol packaging packagers can now reach a greater range of customers."

1958 AEROSOL ADVERTISING EXPENDITURES

Product	*General Magazines*	*Farm Magazines*	*Newspaper Sections*	*Network Television*	*Newspapers*	*Spot TV*
Acnecare	3,710	....	6,560	....	....	....
Eez Foot Powder and Spray	....	....	....	....	20,794	....
Ridz Dog Repellent	13,496	....	....	....	....	....
Ipana Push Button	....	....	....	775,000	....	....
Sno White Toothpaste	....	....	....	....	37,183	107,550
Adorn Hair Spray	126,173	....	247,390	No Data	....	405,400
Antell Spray Net	....	....	....	....	....	485,390
Breck Hair Set Mist	145,928	....	84,815	346,500	....	....
Helene Curtis Spray Net	186,170	....	95,220	750,000	....	51,430
Helene Curtis Tempo	....	....	24,130	400,000	....	77,490
Living Curl	....	....	....	550,000	....	....
Max Factor Curl Control	....	....	31,875	342,000	....	260,750
Nestle Hair Color	125,220	....	....	....	....	....
Nutri Hair Spray	....	....	....	....	....	16,230
Revlon Hair Sprays	248,000	....	252,400	450,000	....	....
Richard Hudnut Beauty Curl Spray Net	....	....	290,130	....	....	....
Satin Set	....	....	....	450,000	....	....
Tint-N-Set	16,301	....	....	....	....	133,740
Tint-N-Set Color Spray	16,301	....	....	....	....	....
Antell Cosmetics	....	....	....	....	....	442,170
Avon Cosmetics	679,356	43,990	....	....	....	2,770,420
Colgate Rapid Shave	....	....	....	....	....	646,590
Colgate Shaving Cream	196,980	....	....	No Data	....	102,810
Gillette Foamy Shave	....	....	....	No Data	....	....
Mennen Shave Cream	....	....	....	No Data	....	....
Noxzema Medicated Shave Cream	150,815	....	....	50,000	....	....
Palmolive Shave Cream	....	....	....	No Data	....	161,700
Rise Shave Cream	....	....	....	No Data	102,622	509,740
Shulton Old Spice Shaving Cream	64,875	....	25,455	80,000	....	....
Yardley Shaving Foam	14,710	....	....	....	....	....
Air Wick Deodorant	9,325	....	....	No Data	12,906	126,960
Antrol Insecticides	89,031	....	....	....	....	....
Black Flag Insecticides	....	....	....	....	119,199	....
Black Flag Insecticides	21,427	....	....	....	....	....
DuPont Insecticides	24,807	5,880	....	....	....	....
Flit	....	....	....	....	....	44,230
Florient Air Deodorant	....	....	508,328	No Data	116,298	50
Kan Kill	71,120	....	....	No Data	4,147	....
Off Insect Repellent	33,300	....	....	No Data	....	....
Raid Insect Spray	34,980	....	....	No Data	65,782	127,710
612 Insect Repellent	19,054	....	34,034	....	2,090	....
Shell Insecticides	9,315	43,705	....	....	....	....
Wizard Deodorizers	....	....	....	No Data	190,198	126,170

EMSON'S NEW METERED ORAL ATTACHMENTS*

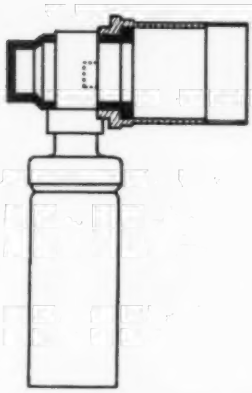
INGENIOUS, POSITIVE MEASURED DOSAGE AND DIRECTIONAL CONTROL



Complete, safe, compact package for personal use. Leakproof, dustproof, foolproof. Stainless Steel or Aluminum. 13½ or 16 cc capacities.

Attachment easily slips over the button, which is part of the valve. Always in correct position. Moulded of sturdy Super Dylan.

Operates easily in the upright position for throat or mouth spray, wash or freshener. Always handy. Delivers the same dosage every time.



- **practical**
- **profitable**
- **marketable**

Here is another example of EMSON inventiveness! Another new major development born on EMSON'S engineering boards. Like EMSON'S famous Metered Valve . . . the most widely used Metered Valve in the world ... it is destined to be regarded as the leader of its type.

EMSON can supply you with the complete package . . . quickly, inexpensively . . . tailor-made to give your product greater consumer acceptance. Our production facilities are geared for immediate action! When you *buy* from EMSON, you *can buy* the complete package—container, valve and actuator.

Let EMSON PRODUCE YOUR NEXT VALVE OR PACKAGE

VALVES FOR: Personal size dispensers, cans, bottles and standard 1" openings (metered or non-metered).

- Stainless steel parts.
- Dosages from 35 mg to 5 cc.
- For cold or pressure filling.
- One piece, moulded, sealproof dip tubes.

ACCESSORIES:

- Refill cartridges.
- Stainless steel, aluminum or metal containers — 10, 13½, 16 cc, 2 oz.
- Mechanical break-up actuator.
- Safety lock.
- Special actuators and caps.
- Nasal and oral attachments.

Send for a sample today.

(*) Covered by U. S. and foreign patents and patents pending.

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MM&R flavors for aerosols

first

Ever since working with the largest supplier of aerosols to the United States Government, during the Second World War, MM&R has helped manufacturers in many industries to solve highly specialized flavoring and perfuming problems in the rapidly expanding aerosol field.

foremost

Fortified with unrivaled experience in the development of flavors for the food and other industries, MM&R is uniquely equipped to aid you in selecting a sales-stimulating flavor to meet every manufacturing requirement.

Write in strict confidence to - MM&R Technical Consulting Division (Aerosols). *There is no substitute for experience.*

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Since 1895 . . . The World's Most Famous Supplier of Essential Oils, Basic Perfume Oils and Concentrated Flavors

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News of Pressure Packaging

Packaging Institute Forms New Aerosol Committee

THE Packaging Institute, in recognition of the important role of aerosols, in the packaging industry, announced formation of an Aerosol Committee late last month. Informal "soundings" which preceded the move revealed a high degree of interest in the proposal for the committee's formation on the part of food, drug, cosmetics, paint, and insecticide packagers, it was stated.

Like the 25 other technical committees of the Packaging Institute, the basic function of the new Aerosol Committee will be to help the user of packaging materials and machinery—the producer of products which require packaging. This is accomplished through the technical committee system of concentrated study in specialized areas which has been developed in the Packaging Institute over the past 20 years.

Serving as chairman for launching of the Aerosol Committee is Fred T. Pickerell, senior buyer of the Schering Corp. He has announced that an organizational meeting, with election of permanent officers, will take place in September, probably in the new offices of the Packaging Institute at 342 Madison Ave., New York City. The first regular working meeting of the group will be held during Packaging Institute's National Packaging Forum, scheduled for Nov. 16-18, Statler-Hilton Hotel, New York City.

Mr. Pickerell is reported to be putting together a tentative program of activities for the new committee, and prospective members are now being contacted. Those interested may obtain further information by getting in touch with Mr. Pickerell at the Schering Corp., 520 Broad St., Newark, N. J.

Much of the work leading to the committee's formation was done by L. H. Zahn, Ciba Pharmaceutical Products, Inc., vice president and director of committee activities of the Packaging Institute; W. B. Tibbets, Union Carbide Plastics Co., and S. D. Smith, Dow Chemical Co., chairman and vice chairman respectively of the Institute's Materials Division, in which this new committee will operate.

A set of broad objectives has been set for the Aerosol Committee, to serve as a guide in its forthcoming studies of this type of container. Among these objectives are development of definitions and nomenclature of the component parts of the aerosol package; establishment of mutually-satisfactory standards for each of these parts; development of effective test procedures for evaluation of the component parts, and cooperation with other organizations and industries which are concerned with aerosol propellants and aerosol filling techniques.

It is expected that the committee's work on component parts will cover the container, the valve (including the dip tube), the closure and the label. Its projected scope will include glass and metal containers, and possibly plastic containers, of various sizes for food and non-food products, plus the more important specialties.

Mojonnier Appoints John Meek

John Meek has been named Western sales and service representative for Mojonnier Associates, Franklin Park, Ill., makers of aerosol packaging machinery. He will move to the Los Angeles area about July 1st.

Mr. Meek joined Mojonnier early this year after eight years with American Safety Razor where he was supervisor of production and process engineering in the Kingsbury Ordnance Plant, LaPorte, Ind. Before that he spent five years with Plimpton Press, LaPorte. He is a native of Indiana and attended Purdue University.

•

New Midwest Food Filler

Press-'N-Serve Foods, Inc., 3814 Nebraska, St. Louis 18, Mo., has just completed installation of a new custom-packaging line for pressure-dispensed food products. The firm, a Midwest pioneer in custom food packaging for aerosol containers, specializes in private label packaging for food concerns.

•

CSMA Lists Fall Meeting

A two-day meeting of the board of governors, executive boards, and committees of the Chemical Specialties Manufacturers Association has been announced for Sept. 15-16 at the St. Moritz Hotel, New York, N. Y.

During the meeting a luncheon — open to all members — will be held on Tuesday, Sept. 15, and a reception and cocktail party will be held at 5:30 that same evening.

•

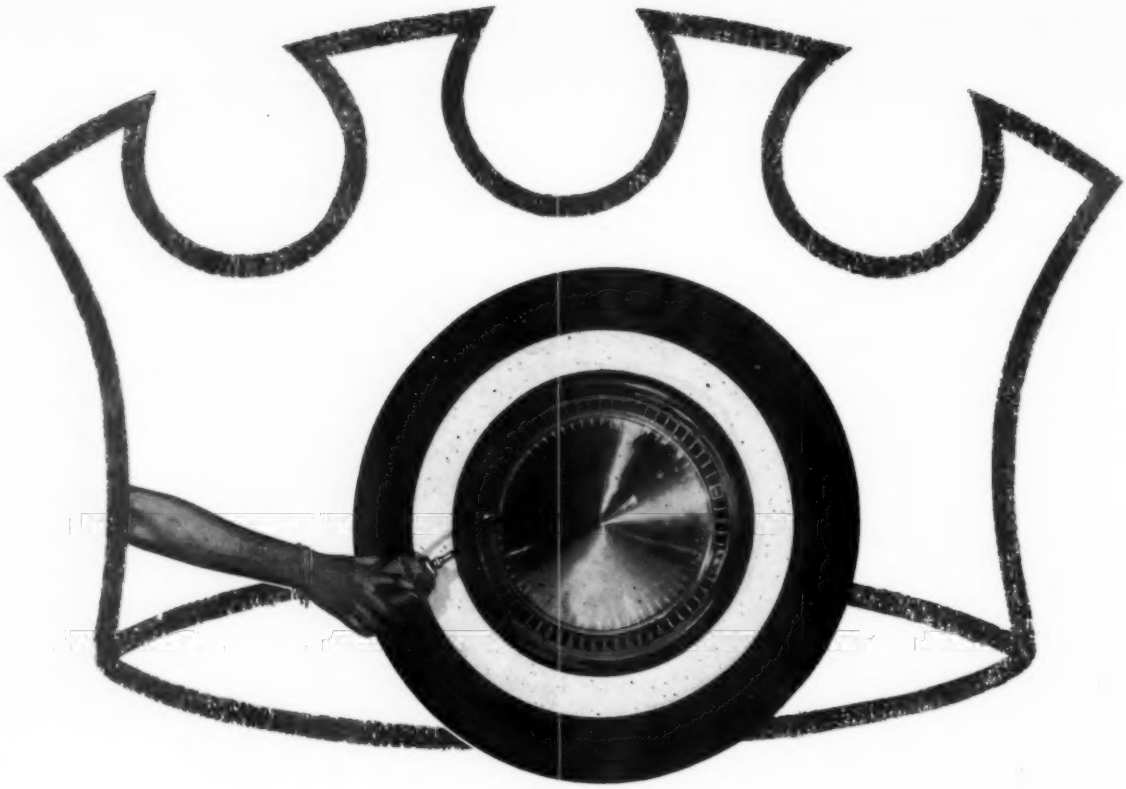
General Chem. Study Grant

Allied Chemical's General Chemical Division has awarded a grant in aid of $3,000 to the College of Pharmacy, St. John's University, Brooklyn, N. Y., for aerosol research.

The program, under the direction of Dr. John J. Sciarra, assistant professor of pharmaceutical chemistry, will be devoted to the study of the solubility and stability of pharmaceuticals in aerosols.

The College of Pharmacy at St. John's University has one of the newest and largest specialized aerosol research laboratories in the country and is one of several colleges and universities now devoting part of their development programs solely to aerosol research.

General Chemical Division, the producer of "Genetron" aerosol propellants, has awarded the grant in aid as an extension of its own aerosol research and technical service



Aerosol Containers* by Crown

open profitable new markets

Fully inflate a flat tire in seconds. Thousands and thousands of motorists have seen the value of this new aerosol product which provides this convenience, anywhere, any time, easily. Ideal for bicycle tires, wading pools and other home uses, too. The container, of course, is made by Crown, pioneer and world's largest manufacturer of aerosol cans.

Hundreds of liquids, semi-liquids and gases, marketed in pressurized containers, are bringing new profits to their manufacturers. Are your products among them? Your inquiry will be answered promptly.

*Only Crown manufactures both fabricated and seamless Spra-Tainer aerosol containers.

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programs which embrace all types of aerosol product development. The company's aerosol technical service laboratory is located at Edgewater, N. J. and its research program is conducted at the General Chemical Research Laboratory, Morristown, N. J.

•

Durable Signs Two Pacts

Durable Plastics Ltd., Guildford, Surrey, England, has announced the signing of two licensing agreements to enable foreign companies to produce plastic coating bottles by its process. This brings to three the number of firms holding such licenses:

Parco Pty. Ltd.
Sydney, Australia

Vetreria Bormioli Rocco & Figlio
Casella Postale 53
Parma, Italy

Aeropak S.A.
Vitardo 41
Barcelonia, Spain

Nigel Vinson, managing director of Durable Plastics, has announced the availability of such licenses in other countries.

Fair Trade Bill Attacked as It Clears House Committee

SHARP attacks continued on the controversial Harris Fair Trade Bill late last month as the bill cleared the House Interstate and Foreign Commerce Committee for consideration on the floor of the U. S. House of Representatives. The bill, which aims to permit manufacturers to set minimum retail prices, would affect the aerosol industry in that it would considerably strengthen the hand of the marketer in setting retail prices.

Just prior to the bill clearing the committee, Reps. John B. Bennett (R., Mich.) and John D. Dingell (D., Mich.) both members of the House committee, each issued minority reports claiming that the Harris Bill would hurt small businessmen considerably more than it would help them. Passage of the bill, they reported, would mean *more* federal control of all aspects of retailer operations, and would give new impetus to use of private brands, excessive trade-in allowances, and other retailer giveaways.

Both congressmen claimed that the bill would violate states' rights and would generally increase consumer prices up to $12 billion annually. The National Association of Retail Druggists, chief proponent of the bill, came in for an especially heavy attack by Rep. Dingell.

Later in the month the Department of Justice came out strongly in opposition to the bill, also contending that it would mean "tremendously higher prices to consumers." Robert A. Bicks, acting head of the department's Anti-Trust Division, told a Senate Commerce Subcommittee that it would mean virtual abandonment of free enterprise and price competition in retail merchandising.

"In effect," he declared, "fair trade seems akin to a Federal subsidy. The amount of the subsidy would be fixed by private manufacturers or processors. And the subsidy would be paid, almost like a sales tax, by the American consumer."

Mr. Wicks contended that, rather than eliminating discount stores, it would enable them to prosper by encouraging the introduction of private brand products. He said an "army" of Federal enforcement agents would be needed to prevent discount houses from underselling retailers whose prices were fixed by manufacturers. He indicated that passage would mean a virtual abandonment of anti-trust laws.

The Harris Bill also has drawn heavy fire from the U. S. Dept. of Agriculture, the U. S. Dept. of Commerce, the Federal Trade Commission, and other policy-making government bodies.

(*Aerosol Age* came out against the bill in an editorial on page 29 of the May 1959 issue.—The Editor.)

•

Lakhovsky Visits Europe

Serge J. J. Lakhovsky, chief perfumer of Coty, Inc., New York, left late last month for Europe to attend the Second International Congress of Essential Oils in Grasse.

Chinese Chemist Studies at Old Empire's Laboratory

Pictured at the Old Empire laboratories are (left to right): Hans W. Maucher, vice-president; Robert Hsu; Dr. Hedwig Toome; Ellis Reyner, chief chemist of Old Empire.

Old Empire, Inc., Newark, N. J., custom filler, in cooperation with the U. S. Department of Labor (Bureau of Apprenticeship and Training, International Branch), has made it possible for Robert K. L. Hsu of Taipei, Taiwan, China, to study latest methods and techniques of manufacturing and packaging cosmetic, industrial, fragrance, pharmaceutical and household specialty products. The study program is intended to aid the Government of Free China to develop its industries to meet its economic needs and to promote new business.

When Mr. Hsu completes his six month's training at Old Empire, he will return to his post as chief chemist engineer of the Taiwan Tobacco and Wine Monopoly Bureau, Taiwan, a post he has held since 1948. He will assume the additional function of consultant to the China Productivity Center, in order to acquaint his countrymen with new U. S. modern packaging and manufacturing techniques.

Mr. Hsu earned his B.S. degree from National Chekiang University in 1947. He is a member of the Chinese Chemical Society.

Shulton Revamps Nat'l Sales

The appointment of James Murphy as national sales manager for its Toiletries Division has been announced by Shulton, Inc., New York. He will be responsible for all sales to franchised retailers and wholesalers and will make his headquarters at the company's offices in Clifton, N. J.

Mr. Murphy has been eastern branch manager since 1954. He joined Shulton in 1938 as a sales representative in the New England area. In 1951 he was appointed New England branch manager and in 1952, northeastern branch manager.

Roy Stogner has been named branch manager of the newly formed Northeast Branch, comprising New York City, New York State and New England. He was made a product manager in 1956. Mr. Stogner joined Shulton in 1952 as a sales representative and in 1955 he was named assistant to the sales manager.

Stephen Backiel has been appointed branch manager of the new Middle Atlantic Branch, which includes New Jersey, Delaware, Pennsylvania, Washington, D.C., Maryland, Virginia, West Virginia, Ohio and Kentucky. He was named assistant manager of the Eastern Branch in 1957. He joined Shulton in 1949 as a sales representative and in 1956 he was appointed assistant to the sales manager.

Both Mr. Stogner and Mr. Backiel will make their headquarters at the Shulton offices in New York City.

•

Pyrethrum Board Sued

The Pyrethrum Board of Kenya and Societe Co-operative Des Produits Agricoles, two of the chief world producers of pyrethrum, recently lost a civil suit brought against them by Mitchell Cotts Group Ltd., which until recently had been sales agents for the material in Great Britain and the U. S. The suit, charging conspiracy to breach of contract, was settled on May 26 for damages of $112,000.

Commenting on the suit, J. K. Dick, managing director of Mitchell Cotts, said his company brought the suit to establish its right to a commercial contract freely entered into by a statutory board.

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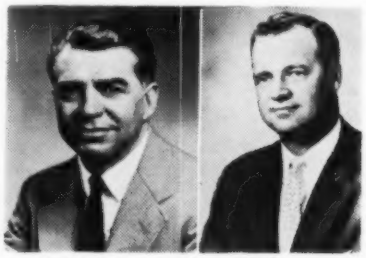
Colgate Names Two VP's

The Colgate-Palmolive Co., New York, a leading marketer of aerosol products, last month announced the election of John L. Bricker and Herbert P. Nack as vice presidents. Mr.



Nack Bricker

Bricker, formerly executive vice president of Outdoor Advertising, Inc., will be in charge of marketing planning.

Mr. Nack will be vice president of Colgate's new Pharmaceutical Laboratories Division and will be responsible for organizing the company's entry into the proprietary and ethical drug fields. He was formerly director of the Professional Products Division of Johnson & Johnson, manufacturer of surgical dressings, baby products, and similar products.

•

Rhodia Appoints Weaver

The appointment of Everett J. Weaver as sales representative of the Aromatic and Odor Control Division of Rhodia, Inc. for the State of Texas, was announced by the company in New York early last month.

Prior to his new appointment Mr. Weaver was analytical chemist with Olin-Mathieson and later, chief chemist for the Butler Chemical Co. His headquarters will be in Houston, Texas.

•

Leinbach to Carr-Lowrey

Carr-Lowrey Glass Co., New York, has announced that H. Donald Leinbach has become a member of its New York sales staff. He is well known in the industry and was associated for the past five years with the Crown Cork and Seal Co.

Risdon Changes Div. Name

Risdon Manufacturing Co., Naugatuck, Conn., a major producer of aerosol valves, last month changed the name of its eight-year-old Valve Division to the "Aerosol Division." Donald S. Tuttle, Jr., sales manager of the division, explained that the name change was adopted because of the increasingly diversified role Risdon has played in Aerosol package development in recent years. One recent innovation has been the manufacture of complete areosol packages —valves, inner containers, and decorative outer containers—for the fragrance industry.

The Aerosol Division's manufacturing takes place at three plants in Naugatuck and Danbury. Risdon valves have been incorporated into spray packages in more than 35 countries throughout the world. In addition to valves that the company exports from its U. S. plant, Risdon valves are also manufactured by licensees in six countries in Europe and the Far East.

•

New Container Research

Current research and testing will soon lead to innovations that will make possible aerosol packaging of many product lines heretofore restricted to traditional packaging methods. That's the opinion of George S. Congdon, manager of technical services for the Can Division of Crown Cork and Seal Co., Philadelphia.

In speaking recently of the work of his staff in this field, Mr. Congdon said, "Pressures up to 110 psi are now possible in disposable aerosol containers and this should be sufficient to dispense any foreseeable product preparations.

"The water-based products, including some foods and certain cosmetics, such as shampoos, had led to intensive research to find container coatings with better continuity and minimum porosity that will resist corrosion and extend shelf life. In addition to the conventional phenolics, epons and vinyls," he said, "we are investigating new plastic coatings of plastisol and organisols."

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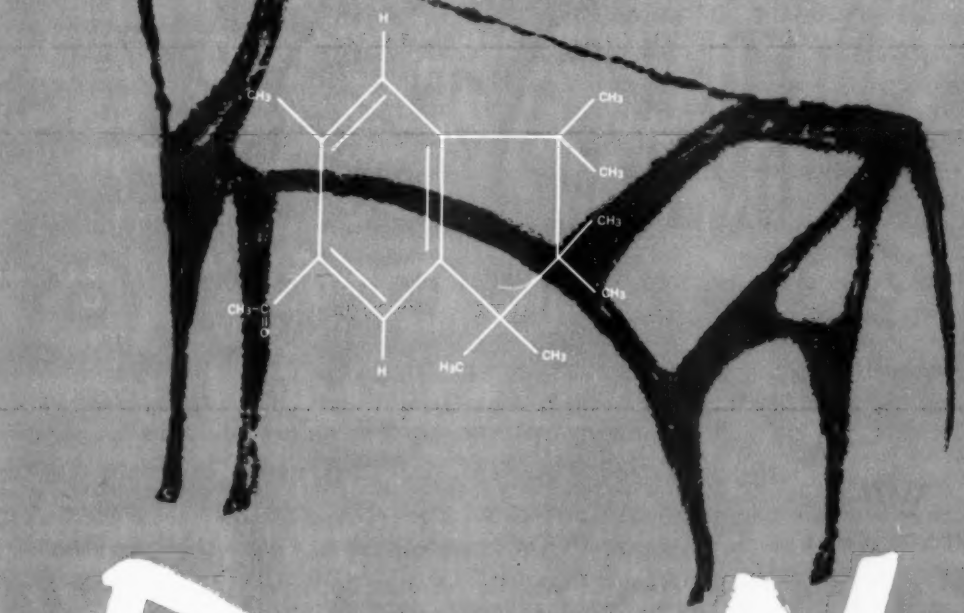
in musk odorants
diffusive
exalting
powerful



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KLM Royal Dutch Airlines, 609 Fifth Avenue, New York 17, New York

Arthur Carter Honored

Arthur H. Carter, recently retired general manager of Green Cross Products, Montreal, was honored by a gathering of his friends at the Engineers' Club in Montreal on May 26th.

M. F. Anderson, executive vice president of Dominion Rubber Co., presented Mr. Carter with several gifts. George E. Flemming, president of Canadian Manufacturers of Chemical Specialties, was chairman and also spoke on behalf of that association. Many of those responsible for the formation of Canadian Agricultural Chemicals Association were also present, including the two past-presidents and the president incumbent, Jack Elliott of Rohm & Haas. Appreciation was expressed for the long and distinguished service which Mr. Carter has rendered to the chemical industry generally.

•

Alexander Scholarship Fund

Dr. G. R. Ferguson, president of Geigy Agricultural Chemicals, last month announced the establishment of the C. C. Alexander Memorial Scholarship Fund at Purdue University. Mr. Alexander, who died in an airplane accident on May 12, 1959, was research manager of Geigy Agricultural Chemicals. He was an alumnus of the Purdue Entomology Department, Class of 1938.

The scholarship, initiated at the suggestion of many of Mr. Alexander's friends both within and outside the chemical industry, will be the first perpetual fund of its kind at Purdue which will give preference to entomology students. Contributions may be made directly to the C. C. Alexander Memorial Scholarship Fund, Purdue Alumni Scholarship Foundation, Lafayette, Indiana.

Dr. Ferguson said that Geigy has made a major contribution to the fund in recognition of Mr. Alexander's years of service with the company and for his contributions to the field of agriculture, as well as to mark their high esteem for him as an individual.

•

Sommer to Shulton Board

Victor F. Sommer was elected to the board of directors of Shulton, Inc., New York manufacturers of Old Spice for Men products, women's toiletries, pharmaceuticals and fine chemicals, at the recent annual meeting of stockholders.

Mr. Sommer was named manager of the Clifton Manufacturing Division in January, 1959. He joined Shulton in 1942.

Osman Joins Thomasson

Albert E. Osman recently joined Thomasson of Pa., Inc., Norristown, Pa., custom filler, as production manager. He comes to that company from the Scranton Aerosol Division of the Scranton Corp., Scranton, Pa.

Mr. Osman is a pioneer in the aerosol industry, having engineered and installed the original Bridgeport Brass aerosol lines at the inception of the low pressure aerosol industry in 1947. A graduate of Lehigh University, Mr. Osman is well known throughout the aerosol industry for his achievements in aerosol production methods and equipment.

•

Branigan Returns to U. S.

George V. Branigan, vice president of Ungerer & Co., New York manufacturer of essential oils, last month returned from a business trip around the world. He visited essential oils sources in the Far East, Middle East, and Europe.

Paints Predicted Soon to Be No. 1 Non-Food Aerosol

BY 1961 paint will be the number one best selling non-food aerosol product on the market. This prediction came last month from Herbert D. Fine, president of Plasti-Kote, Inc., Cleveland, who also estimated an aerosol market of something in the vicinity of 250 million units of aerosol paint by 1970.

Noting that aerosol paints still represent a small percentage of the entire market, Mr. Fine pointed out that the spray can is obviously not intended to replace the conventional five-gallon paint can. It will however, he declared, eventually replace at least 90% of all conventional paints in quarts, pints, and half pint sizes.

Consumer education is an important factor in current growth patterns for aerosol paints, he indicated. For instance, according to one recent survey conducted for Plasti-Kote, only 20% of the public is aware that paint is available in pressurized cans; but of those who have used paint in this form, the aerosol is preferred to conventional painting three-to-one.

More and more sales of aerosol paints are being accounted for by drug stores, supermarkets, and similar outlets, Mr. Fine reported. He attributed this to the fact that aerosol paints particularly lend themselves to mass distribution through volume outlets because they are usually sold in only one size and are easily displayed and marked for impulse selling. The largest increase in aerosol paint volume, he said, is coming from new "decorator" colors, which are attracting women to paint everything from picture frames and lamp bases to shoes and handbags.

Indicative of the growing trend is the case of Plasti-Kote, which threw its conventional paint can business out the window in 1954 to concentrate on paint in aerosol containers. Its daily capacity of 6,000 cans five years ago has jumped to a production capacity of 76,000 cans daily, with anticipated sales this year of over 10 million units. The company now produces 2400 different colors and products, including 350 colors to match major car paints from 1957 to 1959.

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Small, Accurate Fills

CONTAINERS: vials, bottles, jars, cans.

PRODUCTION: up to 480 fills per minute.

TUBE FILLING: metal or plastic.

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Filling Alcohol to Caulking Compound

VOLUME: ¼ oz. to 1 gallon.

PRODUCTION: models for speeds up to 300 per minute.

PRODUCTS: foods, dairy products, drugs, paints, cosmetics, industrials.

CONTAINERS: bottles, cans, tubes, jars, paper cups, pails.

COLTON-ALPHA

Aerosol

ROTARY AND STRAIGHT LINE: gassers, pressure fillers, shakers, crimpers, testers.

LABORATORY EQUIPMENT: hand operated.

VOLUME: up to 500 cc.

CONTAINERS: cans, bottles and vials.

Send for the new Colton chart of filling machine applications. It shows machine types, capacities, speeds, product types, etc., of the world's most complete line of filling equipment.

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If you manufacture fluid, semi-fluid or powdered materials you can now sell the volume users with TMC KING SIZE Aerosol Containers. They give you the proven sales appeal of aerosol convenience in KING SIZE dispensers. It pays to sell quarts instead of ounces. When you make your products easier to use—people use more of it! It deserves looking into... write or phone.

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Equipment–Processes–Bulletins–

Unbreakable Stack Cap

Gilbert Plastics, Inc., Kenilworth, N. J., designers and manufacturers of plastic packaging, has announced the development of a new aerosol plastic stack cap which is unbreakable, highly colorful, and lower in price. Specifically designed to fit fabricated 202 aerosol cans, both valve and nozzle types, the new closure is said to snap on firmly, remove easily, and provide maximum protection to the spray nozzle.

Called the "Gilbert 201," the new closures are molded of high density polyethylene to produce a vibrant color and high sheen. They are available from stock in red, white, yellow and black. Other colors can be matched to specifications. Further information about the caps can be obtained by writing directly to the company at Boright Avenue, Kenilworth, N. J.

•

Deodorized Aerosol Bases

A new bulletin on the use of "Deo-Base" deodorized bases for aerosol insecticides is available from L. Sonneborn Sons, Inc., New York. Complete application and test data on the material, as well as specifications, are also contained in the bulletin, which may be obtained by writing the company at 300 Fourth Avenue, New York 10.

•

High Potency Fungicide

A new high potency fungicidal and fungistatic additive for PVA compounds has been announced by Ottawa Chemical Co., 823 Hamilton Street, Toledo, O. Trade-named "Ottacide I," the material is said to have excellent solubility (at room temperature in toluol, DOP (di-2-ethylhexl phthalate), and a number of other common paint ingredients.

•

Propellant Blending Equipment

A device for "Do-it-yourself" propellant blending is described in the Spring issue of DuPont's *Aerosol News*. The basic equipment includes a mixing chamber, two flow regulators and pumps, plus two pressure gages, a thermometer, and a sampling valve.

"The mixer for small scale blending is essentially a large pipe tee with internal baffling. The regulators are self-contained units which maintain a constant flow rate regardless of variations in either supply or discharge pressure. The flow rate can be changed by moving a graduated dial on top of the regulator."

Risdon Valve Booklet

A new 16-page illustrated four-color booklet describing its complete line of valves and containers has been issued by Risdon Manufacturing Co., Naugatuck, Conn. The booklet shows the wares of both Risdon's Valve Division and Cosmetic Container Division, including the "Mini-Mist" refillable container, the "Vaniti-Mist" one ounce travel or table size, and the "Handi-Mist," a non-refillable container.

•

Liquefied Gas Bulletin

The Linde Co. Division of Union Carbide Corp., 30 East 42nd Street, New York 17, last month issued a six-page folder describing a complete line of small containers for the transport and storage of liquefied gases. Linde is a producer of nitrogen and other compressed gas propellants

Crown Unveils Vapolytic Coating for Aerosol Cans

Containers with the application of the new vapolytic coating developed recently by the product development staff of Crown Cork & Seal Co., Philadelphia, in conjunction with the Eyelet Division of the International Silver Co. The finish, applied to Crown's seamless six ounce "Spra-tainers," provides a metallic luster formerly found (for standard-size aerosol containers) only on aluminum foil labels. It is said to be fadeproof, waterproof, resistant to abrasion and long lasting. Containers with the new coating (first described in the May issue of *Aerosol Age*) will be available in commercial quantities by August.

New Automatic Case Packer

A new combination machine which takes packages from the line, places them in the proper layer arrangement and then stacks them on a "miniature pallet" to form the complete 12 units for one case pack, has been developed. At the same time, shipping cartons are taken from the large, easy-load hopper at left of machine and fully formed automatically.

The carton is then filled with the 12-unit load on the pallet and carried through the gluing, folding and compression. The case packer is available for either 12 or 24 unit pack and in any arrangement of packages in the case.

This unique machine, recently developed by the Thiele Engineering Co. of Minneapolis, is said to provide the economies of rapid, automatic package inserting and at the same time loads cases to give the desired flat-pack, top-up arrangement for easy price marking. The manufacturer expects wide application in the food, chemical, bottling and allied industries.

The automatic case packer includes complete controls, safety devices, and many construction features, such as welded square steel tubing for the frame, removable gluing parts, fully enclosed motors, water-tight wiring and plug-in limit switches. Additional information may be obtained by writing to the company at 556 Seventh Ave., No., Minneapolis, Minnesota.

•

Plastic Tube for Toothpaste

A new coating for polyethylene, developed in the research laboratories of American Can Co. at Barrington, Ill., will permit packaging of toothpaste in plastic squeeze tubes for the first time, the company reported last month. This may be significant for the aerosol industry because of recent large-scale replacement of metal collapsible toothpaste tubes by aerosol containers.

When applied to the tube's inner walls, the newly-developed coating is reported to form an effective barrier against loss by permeation of flavor and essential oils. A number of major toothpaste manufacturers are reported to be laboratory testing the container.

British Automatic Labeler

A new, larger version of the Newman bench type automatic labeling machine for cans has been developed by D. Trapow & Co., Ltd., 113 Regent's Park Road, London N.W. 1. It will handle aerosol containers up to 2¼ inches in diameter and labels up to 7 inches wide.

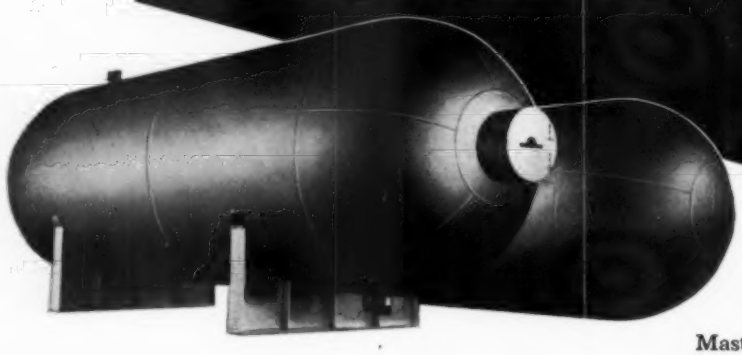
Ramp feeding is used for the containers and the unit is powered by a ¼ h.p. motor. It strip-gums the ends of the labels and can be equipped with an attachment for automatically print coding the ungummed portion of the label.

•

Armstrong Plastic Cap

Armstrong Cork Co., Lancaster, Pa., has developed a new stock design, featuring a swirling effect of the skirt, for its line of plastic aerosol caps. The new design has the appearance of elongated triangles diagonally slanted and slightly overlapping. It is available in popular stock sizes in a wide range of urea and phenolic colors.

PROPELLANT PRESSURE VESSELS of all sizes



Engineered to fit your requirements

FROM 150 GALLONS TO 70,000 GALLONS

Master Tank & Welding, one of the oldest fabricators of ASME pressure vessels for the petroleum and the butane-propane industries, is now producing propellant pressure vessels for the aerosol industry. Both Master plants at Dallas, Texas, and Quincy, Illinois, are equipped with the most modern steel fabricating equipment to assure you of the utmost in safety and quality. This modern equipment also means competitive prices. Send us your specifications for quotation and delivery. No obligation, of course.

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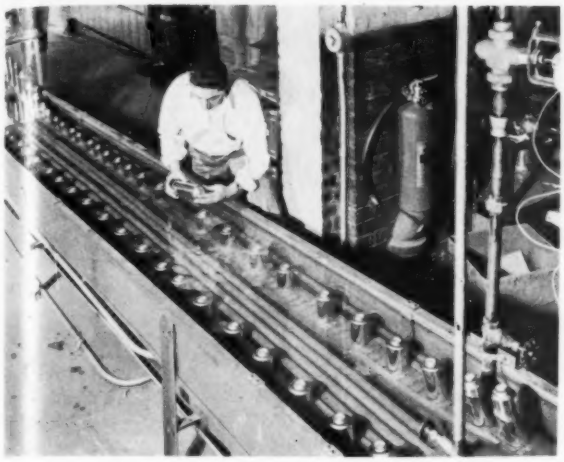
Magnetic Conveyor Units in Chicago Paint Filling Plant



Louis Rue, of Illinois Bronze examining a can from the company's new water bath.

To check for possible leaks in the paint-filled aerosol cans, Illinois Bronze Powder Co., Chicago aerosol filler, passes them through the hot water bath pictured above. With this auto-magnetic method defective containers run through the water bath show a conspicuous trail of bubbles. Secret of the force that steadies various sized cans on the chain belt conveyors is an installation of non-electric magnetic "Magna-Rails" directly beneath each non-magnetic stainless steel belt. The powerful and continuous magnetic field of the stationary "Magna-Rail" units, acting through the conveyor, holds the cans securely at speeds of 80 per minute, yet permits them to be easily plucked from the belt for inspection, as is being done in the photograph by Louis Rue, department superintendent. Another important advantage of this magnetic conveying set-up is elimination of the need for guide rails, which had to be adjusted for various size cans.

A product of Eriez Manufacturing Co., Erie, Pa., "Magna-Rails" are available in easily installed sections of various lengths to permit quick conversion of new or existing conveyor systems into magnetic conveyors or elevators capable of exerting positive non-slip control over metal containers at high speeds and even up near-vertical ascents.

Pulverizers Brochure

A new brochure on "Jet Pulverizers," for the dry pulverizing of materials to micron-size powders, is being distributed by the manufacturers, The Jet Pulverizer Co., Palmyra, N. Y. Grinding, pulverizing and processing actions of the pulverizers are graphically described in this brochure.

Originally used in the cosmetics, paints and chemical processing industries, the "Jet Pulverizers" are said to process materials so that they often display new physical characteristics—thus making them adaptable for use in scores of new applications.

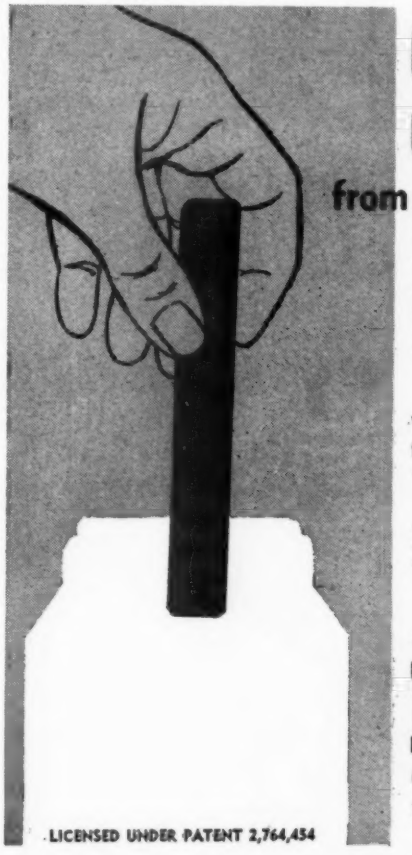
Ruggedly constructed and powered directly by compressed air or superheated steam, the units are available in eight custom-made sizes, with mill diameters from 2" to 36".

A copy of the brochure is available by writing the company at Route #73. Palmyra, N. J.

•

Custom Filling Booklet

Swallowfield Aerosols, Ltd., Swallowfield, Willington (Somerset) England, has issued a new booklet to introduce its facilities to prospective marketers of aerosol filling. Among the services illustrated and described are the company's formulation of finished products to meet specific requirements.



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SOLID STICK

All the solids are formulated in this single stick which you simply drop into your container before adding your propellant and valve.

You get these important advantages:

- Amazingly simplified production process. No dust or boil-over. No mixing of powders.
- Gratifying savings in costs.
- Precision cold or pressure filling.
- Standard colors are WHITE, RED, and BLUE. For special colors, please send sample for matching.

For further information and samples, write to

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OCTOBER

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BUYER'S GUIDE

ISSUE OF AEROSOL AGE

- The third annual Aerosol Buyer's Guide will be the most complete listing of aerosol suppliers ever compiled — and will be used by industry buyers until October of 1960.

- Make sure your company's products or services are listed in the new Buyer's Guide by writing to our editor today. *All product listings are free.* Advertisers in the Buyer's Guide will receive a bold face listing together with a cross reference to the advertising page number.

- **Here are some of the categories that will be listed in the Buyer's Guide:**

Caps
Containers
Valves
Dip Tubes
Propellants
Equipment
Labels
Insecticides
Aromatics & Perfumes
Pharmaceuticals
Emulsifiers
Deodorants
Lanolin
Custom Fillers (for the trade)
Aerosol Products (filled containers for the trade)
Consultants
Miscellaneous

- Make sure that your company takes the fullest advantage of this year's Buyer's Guide by scheduling a dominant advertisement in the same issue to secure the bold face listing in the directory together with the cross reference to your advertising page. Regular advertising rates!

Advertising Deadline for October Is September 12

AEROSOL AGE

CALDWELL **CApital 6-5520** **NEW JERSEY**

"Lif-O-Gen" Oxygen Mask

A disposable mask to insure maximum efficiency with the "Lif-O-Gen" disposable oxygen unit has been announced by Lif-O-Gen, Inc., 1445 City Line Ave., Philadelphia 31, Pa. The new mask is said to give a particularly high concentration of oxygen, although the oxygen unit itself may be used without the mask by simply inserting the tip into the mouth, or nose, pushing the button, and inhaling.

In the photograph above, the mask and oxygen unit are demonstrated by Daniel H. Gattone, president and board chairman of the company and chief developer of the new apparatus. The actual container is only 20 ounces in weight, three inches in diameter, and 10½ inches long. The low pressure unit, containing 100% U.S.P. oxygen, is designed for emergency purposes only, since it will operate intermittently for about 20 to 25 minutes.

Mr. Gattone is co-inventor of the Birch-Gattone aerosol patents in this country, Canada, and Europe.

•

New Ceragraphic Brochure

The Ceragraphic Co., specialists in silk screen printing on glass, plastic and metal containers, has published a new 7-page brochure.

The brochure concerns itself primarily with various graphic techniques and art developments in applied color labelling that have been pioneered by Ceragraphic over the last 21 years. Copies of the brochure may be secured by writing Adrian Greenwald, marketing director, Ceragraphic Co., 171 Newman Street, Hackensack, N. J.

•

Pyrenone Formulation Booklet

A free, handy guide for manufacturers, fillers and packagers of aerosols and other pressurized insecticides has been prepared by Fairfield Chemicals, Food Machinery and Chemical Corp., New York, manufacturer of "Pyrenone" insecticide bases. A combination of pyrethrins and the synergist, piperonyl butoxide, Pyrenone is the toxicant contained in many aerosol mosquito, fly, and roach sprays.

A series of fully tested basic formulations are included in the new booklet. Helpful label suggestions, a glossary of chemical and trademark names to guide in the preparation of labels, plus other valuable facts are also included. Formulations listed include those designed to meet specific requirements — non-toxic sprays, household fly sprays, low cost sprays, roach and ant sprays.

Pyrethrum insecticides are safe for use around covered foodstuffs, and harmless to humans and animals when used as directed. Pyrenone formulations have been approved for control of DDT-resistant flies.

Copies of the free-six-page booklet and additional information may be obtained from the company at 441 Lexington Ave., New York 17.

•

Plastic Bottle Booklet

A new illustrated booklet on high-density polyethylene and isotactic (rigid) polypropylene bottles has been issued by Hercules Powder Co., Wilmington. The booklet points out that the higher strength and rigidity of these new polyolefins has enabled the container manufacturer to produce thinner walled containers and at faster rates with lower material and processing costs.

The information contained is of limited use to the aerosol formulator because little is mentioned about this type of container. However, there is some material of value on closures made of these materials.

AEROFLEX® "P" DIP TUBES

- **QUALITY CONTROLLED**—Every shipment laboratory tested for crack resistance.
- Ideal for aerosols, atomizers, squeeze bottles and lotion pumps.
- Odorless, non-toxic, resistant to most filler and propellant chemicals, crack resistant through ANCHOR's exclusive formulation of polyethylene.
- Close tolerances maintained. Precision cut and stack packed tubes available.
- Nylon dip tubes extruded for special applications.
- ANCHOR also extrudes in all of the newest materials—**polycarbonate, polypropylene,** and **rigid polyvinyl chloride** . . . offering reliable service and on-time deliveries.

WRITE TODAY for "Extruded Plastics" brochure.

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Bulletin on "Sarkosyls"

A technical bulletin describing some of the numerous applications in the aerosol field of "Sarkosyl" surfactants has recently been issued by the Industrial Chemical Division of Geigy Chemical Corp., Ardsley, N. Y. The Sarkosyls are high molecular weight carboxylic acids or their sodium salts.

They have a number of applications in the field of detergents, cosmetics and toilet goods and pharmaceuticals, and also are efficiently employed in such widely different types of products as fungicides and in metal finishing and processing.

As cosmetic detergents, the Sarkosyls are said to combine some of the more desirable features of both fatty acid soaps and alcohol sulfates. They are especially useful in aerosol and in acid tint shampoos. In aerosol formulations, sodium salts of Sarkosyl L are non-corrosive at 10%. The Sarkosyls have applications in the formulation of aerosol shaving creams and in cleansers, lotions and creams. They may be incorporated in aerosol formulations such as hair sprays as corrosion inhibitors.

Sarkosyl NL 30 is recommended for use in dilution with aqueous alcohol to form an efficient aerosol or spray type glass cleaner, especially recommended for use on automobiles because of its non-corrosive character. The cleaner leaves a powdery rather than an oily film, which dusts off without resoiling or softening windshield wipers.

Copies of the bulletin are available by writing to the Industrial Chemical Division of Geigy at Saw Mill River Rd., Ardsley, N. Y.

•

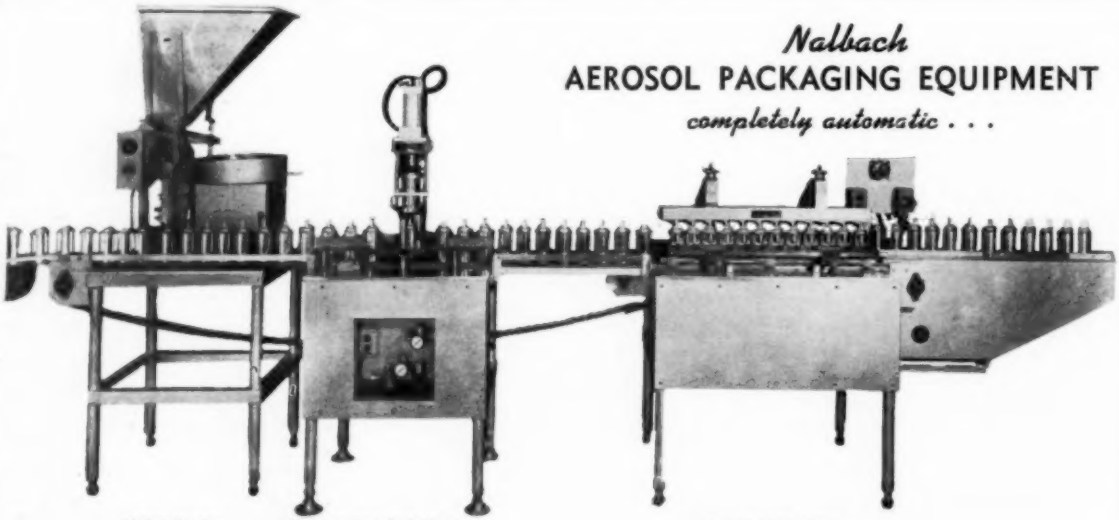
New Container Stapler

The Model C-F of the "King-Size Clipper," a new set-up unit for empty cartons, has been announced by the Container Stapling Corp., Herrin, Ill. The lightweight unit, which weighs only 66 pounds, has operating arms of high strength aluminum. The unit is operated by a foot treadle motion, with a gravity return to reduce operator fatigue.

Particle Analysis Service

Interlab, Inc., 437 Fifth Ave., New York 16, has announced a new particle data analysis service, which will be operated in association with Particle Data Labs, Elmhurst, Ill. Firms located in Metropolitan New York, Northern New Jersey, and Lower Connecticut, may obtain details of this service, which uses the Coulter electronic principle to provide distribution curves (particle weight and size), on systems down to less than 0.5 microns. The scale of charges for analytical work is described as modest, with accuracies of the order of 1% or better usual. Interlab also sells the Coulter particle counter in the same area and offers technical guidance on its application.

Analyses of more than 120 different kinds of particles have been successfully undertaken, and these include such categories as abrasives, explosives, catalysts, ceramics, cosmetics, soils, sugars, oils, emulsions, pigments, polymers, metal powders, ink emulsions, pharmaceuticals, etc.



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AEROSOL PACKAGING EQUIPMENT
completely automatic . . .

Valve Feeder
Crimper and Code Dater (Mod. 1-HAC)
Gasser and Shaker (Mod. 12G.S.)

THE CRIMPER:
- Crimps and code dates simultaneously
- Features a cap-and-valve centering device
- Crimping head is adjustable for height and depth of crimp desired

THE GASSER AND SHAKER:
- Gasses 12 containers simultaneously
- Adjustable to line speed, shake, time, and height changes.

These are but a few of the excellent features engineered into this equipment.
Available as a unit or as separate components.

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New Hair Spray Resin Developed to Improve Product Life

A NEW resin copolymer which is said to enable aerosol hair preparations packagers to control the after-spray permanency of their products simply by varying the degree to which the resin is neutralized to impart water solubility has been introduced by the Resin Division of National Starch and Chemical Corp., New York.

Designated as "Resyn 78-3010," the new compound was reported to be entirely unrelated in chemical composition to any previously patented hair spray resins now in commercial use. National pointed out that its resin eliminates the need for complex formulation changes — such as the addition of water soluble Lanolin or various plasticizers — to alter hair spray properties.

As supplied to packagers, the resin will be water insoluble and in a dry pearl form, the developer stated. Water solubility is readily imparted in the packer's plant by neutralization with AMPD (2-amino-2 methyl-1, 3 propanediol). The degree of this neutralization determines after-spray life of the final product: the greater the degree of neutralization, the greater the resin's water solubility and the shorter the hair spray's lasting qualities.

As an example of how the resin could be used, National said that a 50% neutralization would produce a hair spray lasting several days after application. Conversely, neutralization as high as 90% would make the Resyn highly water soluble, creating a hair spray with comparatively short life but having other desirable properties.

National reported that the new material is completely odorless and that it can be readily perfumed. Preparation in dry form was also said to facilitate handling ease.

According to A. G. Battaglia, Resin Division manager, "Resyn 78-3010" is recommended as a complete replacement for the aerosol hair spray resins now on the market. Priced in the range of 75 cents per pound, the new product provides high quality, yet affords great savings, Mr. Battaglia said. He explained that it may be substituted for costlier resins on a pound for pound basis.

National's "Resyn 78-3010" is now being tested by several hair spray packers. Samples are available on request from National Starch and Chemical Corp., Resin Division, 750 Third Ave., New York 17.

•

"Mist-Top" Perfume Packages

Two new "Mist-Top" perfume and cologne dispensers, designed to emit a fine, vaporized aerosol spray, have been designed by Valve Corp. of America, Bridgeport. The new dispensers are said to combine attractive appearance with reliable operation. An optional feature is a unique new cam locking device which locks the actuator to prevent accidental release of spray.

Available to cosmetic packagers, fillers and manufacturers, the dispensers come in a 16 cc. perfume size and a two-ounce unit for colognes. The perfume container is fitted with a 50 mg. metered valve while the cologne dispenser comes with either a metered 50 or 100 mg. valve or a non-metered nylon valve. Overall size of the perfume package is 7/8" x 3 1/8" with the cologne unit at 1 3/8" x 3 1/2".

"Mist-Top" components are plastic and are encased in an aluminum, alcohol resistant cap. Cap is available in gold with standard order and other colors upon request. Aluminum tube comes in a variety of opaque colors and is manufactured by Peerless Tube Company, Bloomfield, N. J. Lettering and other descriptive matter are silk-screened by Permolast, Waterbury, Conn.

•

New Cattle Repellent

A new dairy cattle and livestock aerosol insect repellent has been introduced by Globe Laboratories, Inc., Fort Worth, Tex. Containing "Tabatrex," the new product is said to repel house flies, stable flies, horse and horn flies, mosquitoes, and gnats. It is being cold-filled at 35 psi.

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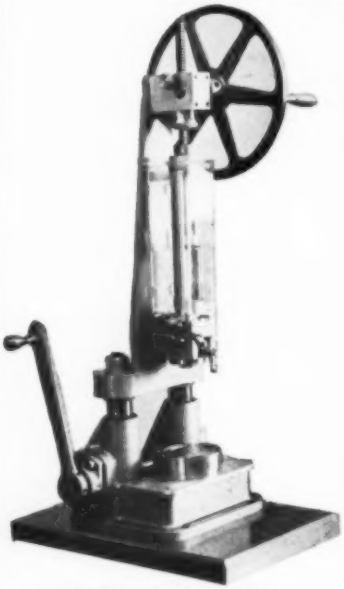

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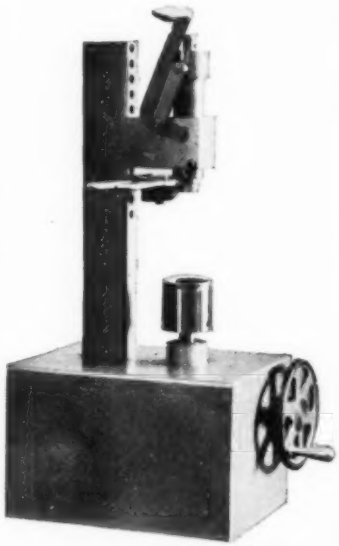

Foresman Hand Operated Vial Capper

Aerosol Container

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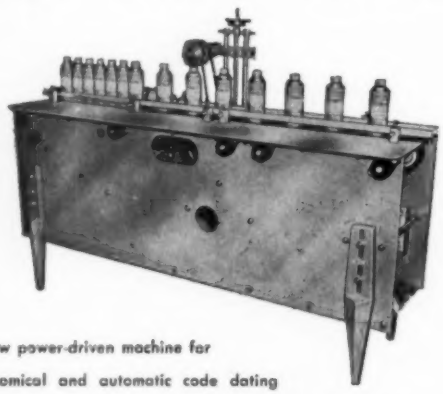

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Two New Rose Fungicides

Scientists have obtained nearly complete control of black spot, the nation's most destructive rose disease, by using two new fungicides, the U.S. Department of Agriculture reported late last month.

The fungicides — Phaltan (n-trichloromethylthiophthalimide) and Cyprex (n-dodecylguanidine acetate) — are organic chemical compounds. Applied to seriously infected foliage of rose plants, each fungicide was used as part of a combination spray in experiments conducted in 1957-58 at USDA's Agricultural Research Center, Beltsville, Md.

The combination spray included either of the miticides Aramite or Malathion, plus both of the insecticides DDT and lindane. These chemicals are commonly used in combination sprays and were found to have no effect on the action of the fungicide. Their insect-killing power is not reduced by presence of the fungicide.

Combining of different chemicals in one multi-purpose spray was developed through USDA research that began in 1950. The work on roses is being carried on by Dr. John G. Palmer, Thomas J. Henneberry, and Robert V. Travis of USDA's Agricultural Research Service. In 1957 experiments, no injury to the rose plants after application of the combination sprays was observed. In 1958 experiments, the scientists noted the stunting of new rose plant growth after treatment with a combination spray in which Cyprex was used. Reasons for this effect have not yet been determined.

Zineb, another fungicide used in the experiments as part of combination sprays provided considerably less control of blackspot infections than either Phaltan or Cyprex.

The combination sprays were applied weekly from July 17 until Sept. 17 in 1957, and from June 10 to Sept. 9 in 1958, during periods of greatest black spot infection. Applications were made with a two-gallon compressed-air sprayer, at 60 pounds-per-square-inch pressure. The scientists announced that they will make further evaluations before rates of application are released.

Black spot occurs widely in the United States. The fungus produces unsightly spots on leaves, causing them to yellow and drop prematurely. Serious infections frequently kill the plants.

•

Hazel Bishop Changes Execs.

Hazel Bishop, Inc., New York, aerosol marketer, recently announced a number of key executive changes. At the top level, Herman L. Johnson, who directed repackaging of the company's product line and reorganization of its sales force, was made executive vice-president to head domestic sales, foreign activities, and syndicate store operations.

Edward A. Ochs, former sales promotion manager at Revlon and general sales manager of LaCrosse before joining Hazel Bishop in the post of general sales manager two years ago, was made vice-president in charge of marketing for drug and department store outlets.

Shulton Advertising Campaign

Bridgeport's line of aerosol insecticides, completely modernized for greater mass appeal and sales by Shulton, Inc., is being strongly advertised nationally over the CBS and NBC radio networks this summer. The eight-week campaign features commercials recorded by comedian Jonathan Winters, covering all three Bridgeport insect sprays — "Bug Bomb," "Slug-a-Bug" and "Ant-Roach Killer." Wesley Associates is the agency.

"Improved formulas, handsome new containers with a 'family' design, pleasant scents and competitive prices have retailers enthusiastic," declares Mr. David Price, sales manager of Shulton's Fine Chemicals Division, which markets the Bridgeport line. "We look forward to Bridgeport stepping up this year to the highest sales figures in its history, and we're advertising on a saturation basis to accomplish that goal." He also reported plans to buy heavy radio and newspaper advertising.

Pennsalt Uses TV to Educate Teenagers on Aerosols

THE story of the growth of aerosols, how pressure packages work, and how they benefit consumers was told recently to science students in more than 30 junior high schools in the Greater Philadelphia area through the medium of educational television. Television tutors for the television science lecture were Robert Weiner and Allen Reed, aerosol technical service men of Pennsalt Chemicals Corp., manufacturer of a complete line of "Isotron" propellants for the pressurized packaging industry.

Messrs. Weiner and Reed, members of the research and development staff at Pennsalt's central research laboratories, used charts, diagrams, aerosol containers, and a motion picture in their informative half-hour program on WHYY-TV, Philadelphia's educational television station, on June 4. Sponsored by the American Chemical Society, the program was one of a WHYY-TV closed circuit series beamed weekly to young science students in their classrooms.

The technical service men traced the growth of the aerosol from the time the chlorofluorohydrocarbons were first used as refrigerants in the 1920s to their abundant present-day application as refrigerants and propellants following the discovery during the 1940s of the efficiency of loading insecticides into pressurized containers and the effectiveness of an aerosol spray. They cited the G I "bug bomb" of World War II fame as the first consumer application of the aerosol concept.

The Pennsalt presentation over WHYY-TV's closed circuit to the classrooms covered the differences between types of aerosols. Charts illustrated various phases in the workings of each type. One schematic diagram of the foam aerosol showed what happens before and after shaking; another, valve types; a third, the space and surface coating of the aerosol.

A film demonstrating the mechanical operation of assembling an aerosol climaxed the program. The film showed a process similar to that which occurs in Pennsalt's laboratories during developmental activities in cooperation with research men of customer companies. The film included testing and sampling of Isotron propellants and products in developing new uses for aerosols. This phase of the TV program stressed the practical application of laboratory research and development work to assist consumer product manufacturers who are marketing an increasing number of products in pressurized containers to an equally increasing number of consumers.

•

Peterson to UN Committee

Harry E. Peterson, president of Peterson Filling and Packaging Co. of Danville, Ill., has been appointed industry finance chairman of the Chemical Specialties Industry of the United States Committee for the United Nations. The purpose of the committee is to "arouse interest in, disseminate facts about the United Nations and to promote the observance of United Nations Day in the United States."

•

Florasynth Appoints Stein

Nathan Stein has been elected assistant secretary of Florasynth Laboratories, Inc., New York, manufacturers of basic perfuming materials for the food, drug and cosmetic industries. He has been associated with Florasynth Laboratories since 1946 at their company's head offices in New York City as accountant and controller.

Nathan Stein of Florasynth

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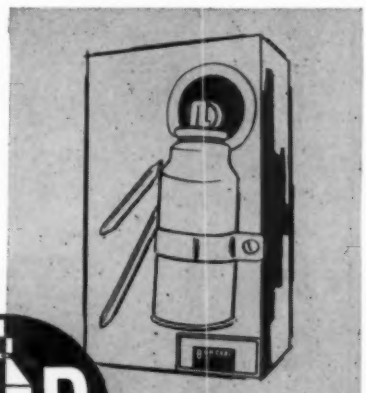
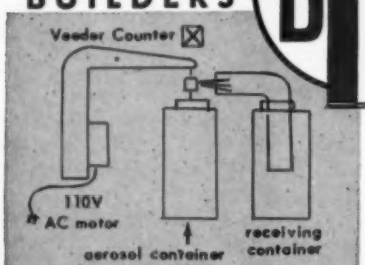


BUILDERS B P PRODUCTS



Sprays automatically for 15 seconds at 2 minute intervals.

You should know the discharge rate for each valve and actuator you are considering.

If the product is used up too quickly or too slowly due to an improper valve or actuator, the consumer may not re order.

Know how many times the actuator will be pushed to expel the contents.

Also use as an automatic spray unit for checking odorants, deodorizers, insecticides, etc.

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Weigh can before and after to give amount used by each valve or actuator tested.

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Curl Strength

(*From Page* 42)

quently there is no evidence of an additive effect on (K) of two sprayings over an interval of 24 hours.

Summary

In summary, a technique has been described which permits an evalua-

tion of the resistance to deformation of curls and waves which have been formed by various hair treatments. It is possible to distinguish between the effects of various treatments with reasonable statistical reliability. It has been shown that the curl strength index of water waved tresses (and its stability to high humidity) and that of those tresses treated with hair sprays is considerably lower than that exhibited by tresses treated with thioglycolic acid solutions.

While this preliminary work has brought out several positive results it has also demonstrated the need for continued work to reduce the magnitude of variability of K among the weak tresses.

Acknowledgment

The authors express their appreciation to Drs. D. H. Powers and M. M. Rieger for their interest, assistance and encouragement, and to Mrs. C. W. Higgins for her painstaking efforts in the laboratory testing procedures and in the assembling of data.★

Aerosol Publicity

(*From Page* 33)

licizing it locally — before, during, and after.

Records will be kept of the store's aerosol sales and shopper traffic during the week of the promotion for comparision with normal aerosol sales.

The aerosol industry can expect multiple benefits from this promotion.

It will give us a compelling case history that can be publicized through features and photos in media serving supermarket retailers and, with variations, in publications serving other specialized retailing fields.

An instruction and information kit, based on results of the supermarket aerosol promotion, can be made available by the Aerosol Division to any retailer handling aerosols.

The display and demonstration provides an opportunity to place promotional material in the hands of hundreds of actual consumers, and to learn first-hand their likes and dislikes concerning aerosols.

We may also get information of value to any Aerosol Division member marketers who want to improve their own proprietary product promotions at the retail level.

Need for publicity and promotion aimed at retailers in no way lessens the importance of keeping consumers sold on aerosol packaging. Consumer interest and demand must be sustained if retailers' sales efforts are to be rewarded.

The hard core of the publicity program, therefore, continues to be an active campaign of contact, idea seeding, and placement with editors and writers for:

Newspapers
Feature syndicates
Women's magazines
Shelter publications
Men's magazines
General interest magazines
Science and Hobby publications, and
Company House Organs

In the coming year we are going to try to interest one of the major picture magazines—*Life* or *Look*—in doing a feature on aerosols.

A word about house organs—

These publications, sponsored by companies, industry groups and associations, reach a larger combined audience than do the top 50 national mass media combined.

One of our projects will be preparation and distribution of a well-illustrated press package on aerosols to thousands of leading house organ editors, from which we can expect substantial pick-up and mass readership.

The current publicity program also includes provision for several newspaper mats, long accepted as an effective, low-cost way of reaching hundreds of thousands of consumers.

You will be interested to know that the Aerosol Division's film, "The Magic Button," has had more than 108 showings, and has been seen by an estimated audience of more than three million (according to latest re-

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ports). We expect to keep it in circulation to television stations across the country as long as it is in demand.

If sufficient funds, in addition to the goal set for the coming year's program, should become available, the Publicity Committee will give serious consideration to the production and distribution of another TV film on aerosols. Although costs of film production have risen some in the past few years, a general interest, non-commercial film such as "The Magic Button," remains one of the lowest-cost-per-impression vehicles for reaching consumers en masse.

The Publicity Committee plans a progress report on publicity activities to all Aerosol Division members, at least four times during the coming year.

We hope it will keep you up to date painlessly with your industry-wide program. We also hope it will be well-read, as it will give your company repeated opportunities to tie-in your own advertising and promotion with the industry publicity activities and themes.★

Dry Ice Propellants

(*From Page 26*)

responds to our laboratory findings with CO_2 pressurized containers at the various temperatures indicated.

The difference between the two imposed new curves — the one determined experimentally and the other taken from accepted tables for such compressed gases as nitrogen, propane, etc. — is very slight and explainable on the basis of CO_2's solubility rate in the active product. The rather sharp upswing at the end of the curve is explained by the alcohol used as solvent which, at 70°C., already shows an expansion factor. The fact that the experimentally-determined curve shows, at the outset, a lower position than the theoretical is due to an initial CO_2 product absorption when temperature commences to rise. This means that the internal pressure of a container, at room temperature, remains practically constant regardless of whether the temperature (within an acceptable range) rises or falls! If lower temperatures are introduced, the product releases CO_2 into the head space of the container so that a relatively constant pressure is maintained.

These fundamentals enable aerosol technicians to formulate products with CO_2 pressures, without regard for pressure changes due to external or climatic factors. In other words, a formulation developed for room temperature performance will act the same if pressurized with CO_2 dry ice pellets at 0°C. or at 50°C., since the internal pressure is practically independent of temperature variations. Further, it is possible to set the optimum pressure in the original filling and be assured of its constancy until the container is empty.

Now solved are all technical problems in connection with the manufacture of transparent dry ice pellets for pressure packages. Each such pellet, according to size, will produce the desired internal pressure and the formulator has only to select size according to his product evaluation. That the selection is limited to a relatively small amount of sizes is explained by the fact that the resulting over-pressure is easily determined by measuring the absorption rate of product and empty head-space in the container. Since the active product will absorb many times the volume of CO_2 necessary, active product charge tolerances of as much as plus or minus 5% will still yield the desired internal pressure. With (at the most) two pellet sizes to choose from, according to the chemical properties of the active product and solvent being used, one can settle very quickly on the proper one, from among six different pellet sizes, for charging 6, 12 or 18-ounce containers.

Assuming a leak-tight package, shelf-life of a CO_2 pressurized package is practically unlimited, even as with the other processes. However, with foodstuffs, the CO_2 process has a decided preservation advantage. Further, with this process, with the exception of the active product itself or the reaction of solvents on metals, there is no container corrosion problem with either tinplate, black plate, or aluminum. As with every new product or process, particularly when the application field is so broad, there will be a certain number of "bugs" to overcome. Those minor ones which still remain for this process can be quickly and easily overcome if the suggestions made here about product selection (and, more important, valve and spray nozzle construction) are followed. It is to be emphasized that valve components satisfactory for the

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other processes are not satisfactory for CO_2. But the changes required are minor. In the light of so many other problems which are still to be solved, and which arise in the aerosol field practically every day, the solution of those presented by the CO_2 process could yield fruitful and profitable results.★

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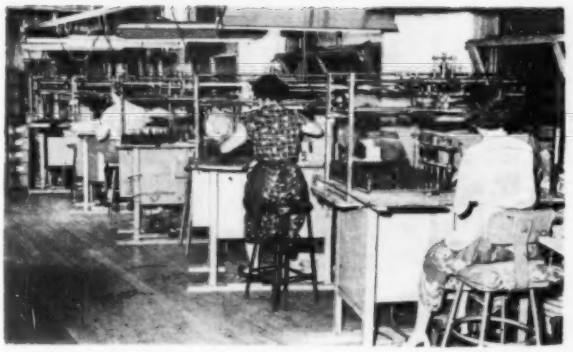
Metal Fabricators

(*From Page* 34)

lays claim to being the only metallic cap fabricator that fits its caps to the crimped ferrule of its customers, that is, it varies its tooling with each major order to insure tight-fitting overcaps. This type of service, in both the cap and container line, has enabled the company to land such accounts as Avon, Revlon, Rexall, Max Factor, Houbigant, Stanley Home Products, City, Lanvin, and a score of others. In fact the company's customer list reads like a "Who's Who" among major aerosol perfume, cologne, and hair spray marketers.

No small factor in the success of the company (in addition to its obvious high degree of metal technology) has been its association with the Monroe-Danford Co., its exclusive sales agents. Monroe-Danford represents the company at packaging shows, chemical specialties, cosmetic chemists, and toilet goods conventions, etc.

But it is in metal technology that the company has made its real mark. Through each step in the decorating process the caps and containers are subjected to rigid quality control inspections, so that by the time they have had their final polishing they have been thoroughly scrutinized three or four times.



The metal decorating machines are used to apply some of the fancy whirls and tracings found on the luxury-type aerosol cologne containers.

Many of the processes have been developed by Metal Fabrications engineers, and other conventional processes used by other firms have been considerably refined. One new method recently announced by Rubin Potoff, Metal Fabrications president, for instance, involves a completely new method of buffing aluminum cylinders.

The whole manufacturing process for both caps and small containers begins with a roll of steel (or aluminum) about four inches wide. This metal is fed into an eyelet machine, which first punches a circular shaped slug out of the roll. This slug is then punched out on consecutive stamping "stations," each one taking a deeper "bite" until the desired shape is achieved.

From there the caps (for they are now recognizable by their characteristic shapes) are moved to an automatic degreaser. This unit was developed by Metal Fabrications to handle the particularly difficult chore of removing the lubricant left by the

eyelet machine. This process is accomplished by use of temperature and pressure.

Next the caps are carefully buffed and polished and the gold or silver pigment sprayed or dipped on. After baking to insure even, lasting finish, the caps are polished again and then sprayed with a clear lacquer to prevent finger marring when they are handled on the final containers.

Metal Fabrications also does other fancy metal decoration, embossing and debossing, etc. And in addition to its work with caps and containers, the company can apply special protective coatings for valve mounting cups (which are sometimes necessary for especially corrosive products or for those that may break down under contact with metal).

One of the really striking things about the company, however, is the way it has "caught on" to the aerosol way of doing things. This is especially evident with the time factor, where the company's plans department is able to show the customer final plans for the cap he has specified the just one day after the customer submits his original specifications. This speed of operation, combined with the company's metal technology has enabled it to become a major factor in the new surge of aerosol perfume packaging.★

Spray Deposits

(*From Page* 23)

and/or the orifices to obtain a satisfactory spray.

Some factors that we have found to be important in obtaining satisfactory deposits have been previously discussed(2, 3) and are summarized in Table I.

The results of a series of tests with several insecticide pressurized products and the amount of residue found on vertical plates 12 in. from the valve are shown in Table II.

The results of a series of tests in which the formulation and nozzles were varied over a wide range are given in Table III. With a typical aerosol formula and using a large outlet orifice producing a discharge rate of 2.4 grams per second and particle size of 28 microns MMD, 81% of the aerosol solution was deposited on the plate at 6 inches, while only 40% was recovered at 12 inches. Formula E with a slow discharge rate of 0.65 grams per second and a MMD of 61 microns deposited 71% at 12 inches and only 36% at 24 inches. The most efficient spraying distances would be less than 12 inches. Formula F with a high discharge rate and a MMD of 400 microns gave 76% of the spray at 24 inches.

The results of a typical residual type insecticide spray dispensed through nozzles of three different designs are shown in Table IV.

The whirling plate type of spray, with a discharge rate of 0.8 grams-per-second and a mass median diameter of 74 microns, deposited only 68% of the spray at 8 inches. To obtain the maximum deposit it would be necessary to hold the nozzle at less than 8 inches. The same formula with an expansion chamber valve with a discharge rate of 1 gram-per-second and a mass median diameter of 160 microns deposited 83% of the spray 12 inches from the nozzle. The residue type valve with the interior orifices larger (0.030") than the exterior (0.025") and with a MMD of 152 microns, deposited only 66% of the solution at 12 inches. It was observed while the solution was being discharged that the particles were actually splashing on the surface.

Summary

It is apparent from the data presented that pressurized formulas designed for depositing a coating on the surface of an object should be carefully formulated to obtain the desired texture with maximum deposit. The selected valve and the distance that the dispenser is held from the object, must be kept constant to obtained the desired result. With this type of spray 83-85% impingement appears to be the maximum that can be expected, and 70-75% could be considered satisfactory.★

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•

John Kennedy Joins Shulton

The appointment of John Kennedy as a sales supervisor for the consumer products of its Fine Chemicals Division has been announced by Shulton, Inc., New York. He will be responsible for sales of consumer chemicals (including the "Bridgeport Aer-a-sol" line recently acquired by Shulton, Inc.) in the New England area. Prior to joining Shulton, Mr. Kennedy was a sales supervisor for Wildroot Co.

Hair Spray Toxicity

(*From Page* 39)

air volume reaching the alveoli of the lung of the subject during the 5-minute period of exposure, namely, 350 cc. × 16 × 5 = 28,000 cc., or approximately 1 cu. ft. of air.

It must be admitted that minor absorption of spray material may take place from the "dead air" in the upper respiratory tract; such amounts are regarded as inconsequential. The data obtained on the amounts collected in the sampler tube during 5 minutes of exposures for both 10 and 30 second releases for each type of spray are summarized in Table III.

Animal Studies

Rabbits were used for the acute and the 90-day inhalation studies. The choice of this animal subject in preference to the mouse, rat or guinea pig was based on the fact that the rabbit is less likely than the latter to develop respiratory-tract ailments

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incidental to the chilling effects of the spraying procedure. An exposure box with inside measurements of 20" x 22" x 48" equipped with sliding glass doors in front permitted the necessary manipulations of an operator and observation of the subject's behavior during exposure. Five animals partially immobilized were exposed during each operation. The exposure chamber was installed in a large ventilating laboratory hood to permit the rapid clearing of the atmosphere in the chamber between exposures. There were no special preparations of the animals prior to exposure. During exposure the animals' eyes were protected with close-fitting, and easily removed goggles. The frequent, repeated exposures necessitated protection of the eyes to avoid injury.

The operator directed the released spray to the back and sides of the subject's head; however, it was impossible to avoid a small amount of spray from reaching a limited portion of the upper body. The spray was released at distances varying from 6 to 12 inches from the subjects' heads. Upon removal from the exposure chamber, the head and that portion of the upper body exhibiting contamination with spray material were sponged with damp towels using water or dilute alcohol for the spray materials insoluble in water. This precaution was taken to avoid the oral ingestion of materials which may have settled on the fur of the animals.

Acute Inhalation Exposures

In the acute inhalation experiments the animals were subjected to 30-second spray releases every half hour until the contents of the given container (275-400 grams) were exhausted. With the exception of 1 hour during noon time, the animals remained (partially immobilized) in the exposure chamber. The glass sliding doors were held slightly ajar to permit some ventilation. The total weight of spray released during 30 seconds varied with various samples from 20-35 grams of material, the mean being approximately 30 gms. per 30 seconds of release.

The subjects exhibited no adverse effects during the intensive acute exposures with any of the sample types used, nor were any untoward effects noted in the succeeding 4 days following exposure. At this point the subjects were sacrificed for gross and histopathological examination of their tissues. The latter was limited essentially to respiratory tract and lymphoid structures, and was negative, as was the gross examination.

90-day Inhalation Studies

Each group of 5 subjects assigned to each of six spray types were carefully screened before assignment to the experiment. A radiograph of the chest and upper body was taken. Hematology included the determination of per cent hemoglobin, the hematocrit, and differential count of white cells. Hematological examinations were also made at 30-day intervals during the experiment.

In these 90-day studies, exposures were made twice daily (A.M. and P.M.). Following the 30 second spray release, animals remained in the sprayed atmosphere of the chamber for an additional 15 minutes. Upon release from the chamber, the animals were cleaned as indicated above and returned to their housing cages.

At the termination of the 90-day exposures, radiographs of chest and upper body were repeated, hematological examinations made, and the subjects sacrificed for the gross and histological examination of their tissues.

The animals exhibited no adverse effects during or at completion of the 90-day exposures. Radiographs revealed no alterations in the lungs and no retention of radiopaque material in this organ. Hematological examinations during and following the 90-day exposures revealed no blood abnormalities.

Pathology

At autopsy, gross examination of the rabbits in the 90-day inhalation experiment was entirely negative ex-

cept that 2 had slightly pitted kidneys, a lower than usual incidence. Six untreated rabbits of the same size, concurrently taken from stock to serve as controls additional to the general run of our rabbits, were also negative. For each of the test animals (with a few partial exceptions) hematoxylin-eosin stained paraffin sections were made of formalin-fixed liver, kidney, spleen, bone marrow (Wright-Giemsa stained smear also), mesenteric lymph node(s), deep cervical lymph node, and the fatty mass in the upper mediastinum containing the relatively small thoracic lymph nodes and the more or less involuted thymus; also, of lung fixed in both 10% formalin and in Bouin's fluid, and trachea fixed in Bouin. For each control rabbit sections were made of lung, trachea, and the various lymphoid structures mentioned above, and bone marrow smears were also made.

Special stains were limited to periodic acid-Schiff and Congo Red. The former was used because it is a good survey stain for complex carbohydrates, and the latter because it is used for detecting polyvinylpyrrolidone. It should be noted here that the complete composition of some of the test sprays in the present study was not known to us, that special stains do not exist for probably the majority of the total complex of ingredients of the sprays, and that as a generality in thesauroses there are changes visible in the routine stains. Fourteen test (2 or 3 animals per group) and all 6 control rabbits had tissue slides stained by the PAS method (with or without enzymatic digestion to remove glycogen) which included from one to all of the following: lung, spleen, thymus, thoracic lymph nodes, deep cervical lymph node, and mesenteric lymph node(s). Fifteen test and all 6 control rabbits had slides covering the same range of tissues stained with Congo Red.

Results and Comments

The results of the pathological study were so negative that they can best be given in summary form.

1. None of the organs examined showed any suggestion of an epithelioid cell or foam cell or other macrophage storage phenomenon induced by the hair sprays. No epithelioid cell proliferation was seen anywhere. The only accumulation of foam cell macrophages anywhere was in the mesenteric lymph node (but not in the other lymphoid structures, lung, etc.) of one rabbit receiving the lanolin type spray; this unique accumulation was not attributed to the treatment.

2. The lymph nodes, particularly the mesenteric but also the others studied, and the thymus, contained varying but quite small numbers of macrophages with dense granular nonpigmented or light-brown pigmented cytoplasm, and occasionally a few giant cells. These were present to the same degree in control and treated rabbits. This was also the case for the macrophages, less outstanding but somewhat greater in number, containing cellular debris in the spleen. No macrophages anywhere had in their cytoplasm the foamy lightly basophilic material that is characteristic (in hematoxylin-eosin stains) of retained polyvinylpyrrolidone or perhaps some reaction product.

3. With respect to histological lesions of other than a thesaurosis type, all structures examined were either negative or showed only minor incidental changes, and none of the latter had any correlation with treatment.

4. The two special stains showed, as did the hematoxylin-eosin stain, no difference between treated and control animals in degree or quantity of stainable material in the various structures. The granular material in macrophages in lymphoid structures mentioned under 2 was strongly PAS-positive, with or without enzymatic digestion. Its total quantity, as previously mentioned, was relatively small. Congo Red stained less material within macrophages than did PAS, and on the whole was nearly negative, except for staining of cellular debris in the splenic macrophages, and for staining elastic tissue. In the various lymph nodes

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the Congo Red staining was either negative or of trace degree.

Discussion

The physical characteristics (particle size and distribution) of an aerosol hair spray extruded from a pressurized container depend on (1) the formulation of the product, that is, the characteristics of the propellant gases, the solvent, and the nonvolatile hair fixative; (2) the mechanical details of the release mechanism in the nozzle; and (3) in a minor degree, on the temperature of the container and its contents at the time of release. It is significant that 65% of the weight of the released unimpinged spray was made up of particles in a range of 10 microns or less in diameter, indicating that a significant portion of the total material is in the range which may reach the alveoli, that is, the functional portion of the lung.

Minimal quantities of the dry spray were collected from 1 cu. ft. of the air available for inspiration following either the 10 second spray release (0.03-0.4 mgs) or 30 second spray release (0.2-2.0 mgs), calculated as the quantities of the spray inspired in the succeeding 5 minutes. Such amounts are considered insufficient to produce adverse physiological effects. The collection of minimal quantities of spray from the atmosphere would indicate that a large percentage of the particles are impinged on the hair or settle rapidly from the atmosphere after release. A similar conclusion on the rapid settling of the particles from the atmosphere is reached in the case of the animal exposures. No adverse physiological effects were exhibited in the animal tests, in which the administration of the sprays would be considered excessive in comparison to conditions of actual human use.

Acknowledgments

The authors express their gratitude to J. H. Mark, V.M.D., of our Bureau of Medicine for the analyses of the radiographs, to Dr. K. J. Davis, and Mr. S. Saver for assistance with photomicrographs, to Mr. C. C. Boone and Mr. Glenn E. Martin for taking the radiographs, and to Miss

Deborah Reznek for her valuable assistance with the inhalation studies.

Conclusions

1—The physical characteristics of the released spray of six types of aerosol hair spray formulations were investigated.

2—Particle size and distribution patterns of six unimpinged spray types investigated exhibited small variations (less than 10 per cent) between types.

3—Sixty-five per cent by weight of the unimpinged spray consisted of particles measuring 10 microns and less in diameter.

4—The amount of dry spray in 1 cu. ft. of air available for inspiration in the human exposures varied from 0.03 to 0.4 mgs. of dry spray following a 10-second spray release, and from 0.2 to 2.0 mgs. following a 30-second spray release. Such quantities are considered incapable of producing adverse physiologic effects.

5—No adverse toxicologic, hematologic, gross and miscroscopic pathologic, or radiographic effects were observed in the acute and 90-day (twice daily) animal exposures.

6—The data from both the human and animal exposures indicate that the ordinary use of aerosol hair spray preparations of the composition and physical characteristics of those included in our studies poses no problem of safety to users.

Reference

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Food Technology

(*From Page* 32)

taste, color, and wettability of food products. An important fact to consider is the elements which favor these reactions:

—The simultaneous presence of reducing sugars (glucose, lactose) and proteins.

—The relatively high concentration of constituents (this is the case in aerosol products).

—The pH; at a certain pH, a browning takes place.

—The temperature, which contributes to the acceleration of these reactions.

Thus we have to bear in mind that, as regards these phenomena, the aerosol presents some disadvantages in comparison with dried products. It is, however, possible to find correctives and to avoid denaturations in the aerosol. Thus the presence of glucose or other reducing sugars could be avoided to a certain extent; in many cases it is even possible to eliminate the last traces of glucose by enzymatic reaction, achieved either during processing of the product or in the aerosol container itself. This enzymatic reaction consists in an oxidation of glucose with the aid of an oxydase which produces gluconic acid. The reducing group of the glucose is thus destroyed, and the Maillard reaction diminished. Other possibilities are, for example, the addition of sulphur amino acids or other reducing substances which compete with the reducing groups of the sugars.

Independent of the non-enzymatic browning reaction, other denaturations are observed in an aqueous medium. I have already mentioned the retrogradation of starch. Besides this, hydrolytic phenomena appear which frequently disturb the flavors and the lipids (rancidity). Unfortunately, only a very few remedies exist for these phenomena.

Now, let us again consider the advantages of the aerosol. The possibility of deoxidation is certainly a good argument in favor of aerosol packag-

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ing. Fatty products offer considerable advantages in this case. However, nitrogen filling, preceded by air-pumping, is often insufficient to eliminate all the oxygen, because some traces of this gas remain dissolved in the food products themselves. Complete elimination of oxygen can be satisfactorily attained by means of the principle discussed above: an enzymatic oxidation of the glucose. This reaction consumes the last traces of oxygen by oxidation of the natural or added glucose. In an aerosol, oxidation of the fatty products can be effectively avoided by using antioxidants. Indeed, it is noteworthy that the protective effect of antioxidants is very lasting. Under standard conditions the antioxidant tends to be autooxidized in contact with dissolved oxygen. With the aerosol, such phenomena can be avoided. Other causes of rancidity are enzymatic or bacteriological action and, in this case too, the aerosol is particularly satisfactory owing to its ability to guard against spoilage.

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It is now time to discuss the question of enzymes. The enzymatic activity inherent in food products is very often overlooked. The canning industry has recourse to sterilization processes which are sufficiently drastic to destroy all enzymatic activity. However, with dried products (such as vegetables, fruit, tea, etc.), which differ from canned products in that they are generally non-cooked substances, the enzyme problem becomes important. Despite the fact that the absence of water decreases the possibility of enzymatic action, light thermal treatment must be applied before drying, just sufficiently to inactivate the enzymes without producing cooked flavors. Steam or hot-water blanching is very common. With the aerosol, similar and even more marked enzymatic problems arise, especially if the aim is to present, in aerosol form, food products resembling the natural, non-cooked products in quality. In this connection, attention should be drawn to the fact that the filtration sterilization process, used especially for fruit or vegetable juices, can suppress microbiological contamination, but does not stop enzymatic action. Anti-enzymic agents could be of interest in the future, but we feel that the laws regarding food products would considerably limit the application of such agents.

Let us now discuss the bacteriological problems of the aerosol. Heat-sterilization very often has an unfavorable effect on the physical stability of food products, especially in the case of thickening agents, gelling agents, emulsions, etc. Simultaneously, heat-treatments are detrimental to the taste: sterilization of tea or coffee concentrates promotes undesirable flavors.

Incidentally, we must point out that products in powder form are particularly easy to handle with regard to bacteriological problems. Vegetables, and milk and coffee powders can be seriously contaminated without risk of alteration, thanks to their low moisture content. Unfortunately, the aerosol is definitely more sensitive; it is absolutely necessary that aerosol products should be sterile or that, as far as possible, the development of micro-organisms should be stopped by protective agents.

The sterilization of products in aerosol cans (sterilization common in the canning industry) is very difficult in many respects, e.g. heat-resistance of the valve, etc. We believe that, for the safety of the aerosol can itself and the flavor of the products, flash pasteurization will in the future be the more satisfactory technique. This technique consists in heating the product for a few seconds and in continuous process to about 150°C. Products thus sterilized are quickly cooled and poured, in sterile condition, into pre-sterilized containers (soups, sauces, fruit juices, milk, etc.). The value of the flash pasteurition process is based on the fact that the rate of destruction of bacteria spores increases by 10 times/10°C., whereas the chemical denaturation increases only 2 times/10°C. Thus it is possible to increase the organoleptic properties, color, vitamin content, etc., of foods.

Much could be said on the subject of antibacterial agents (sorbic acid, benzoate), products which contribute to bacterial stabilization. It would also be useful to consider the possible use of antibiotics, such as subtilin and nisin (fat product of streptococcus lactis), which can prevent microbiological alterations in cheese, soups, sauces, etc. In this paper it is sufficient to call attention to the fact that this field of possibilities is only in its first stage of development and that it is now advisable to use these products simultaneously with the pasteurization or sterilization process. Thus it it possible to limit the heat treatment effectively and at the same time to ensure satisfactory storage properties of food products.

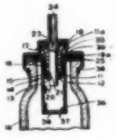
I should like to conclude by emphasizing again that aerosols will represent an important development in food technology. The first phase of this development will meet with great difficulties and adverse opinions, and it is only by adequate technical and scientific effort that these obstacles will be overcome.★

New Aerosol Patents

Listed below is a brief review of recent patents pertinent to the aerosol and related industries.

Complete copies of these patents may be obtained by writing to the Commissioner of Patents, U. S. Patent Office, Washington 25, D. C., and remitting 50c for each copy desired. For orders received outside of the United States the cost will be $1.00 per copy.

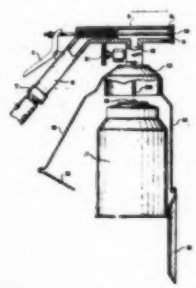
2,886,217. DISPENSING DEVICE. Issued May 12 to Charles G. Thiel, Santa Monica, Calif., assignor to Riker Laboratories, Inc., Los Angeles, Calif.



A draining device, combined with a pressurized container having a valve, and capable of cooperating with said valve for exhausting the liquid contents of said pressurized container, said container having a mouth, said valve having a housing disposed therearound, and closure means attaching said valve and valve housing to said container mouth, said draining device comprising a chamber means having an open end, a closed end wall and a side wall, a small unitary orifice in said side wall in close proximity to said open end, said chamber means being disposed with said closed end wall extending inwardly into said container and being dimensioned to receive, in encompassing relation, said valve housing, said chamber means having holding means adjacent said open end, said holding means being capable of positioning said chamber means about the inwardly projecting portion of said valve and valve housing in a manner which closes said open end of said chamber means.

•

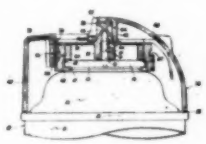
2,887,272. MIXING DEVICE. Issued May 19 to Daniel Rosenthal, Brooklyn, N. Y.



In combination with an independently pressurized replaceable container of fluid treating agent sealed by a removable spring-loaded container valving element, a mixing device for mixing the treating agent with a carrier fluid and comprising a valve housing having a carrier fluid inlet and a discharge outlet for the mixture of treating agent and carrier fluid, a carrier fluid flow control valve positioned within the valve housing, the valve housing being further provided with fluid treating agent inlet means positioned between the carrier fluid inlet and the mixture discharge outlet, a container support mounted on the valve housing and adapted to removably secure said independently pressurized container of the treating agent in operative position adjacent the treating agent inlet means in position to discharge its content of treating agent from said spring-loaded container valving element into the treating agent inlet means, and treating agent flow control means positioned within the valve housing, said treating agent flow control means being operatively associated with said carrier fluid flow control valve whereby to control said container valving element in predetermined relation to said carrier fluid flow control valve and thus control the flow of pressurized fluid treating agent from the container into the valve housing

•

2,887,273. SPRAY DISPENSING ASSEMBLY. Issued May 19 to John J. Anderson, William C. Harris, and Thomas S. Harrison Racine, Wis., assignors to S. C. Johnson & Son, Inc., Racine, Wis.



In a combination with a container for confining fluids under pressure, said container having a cylindrical body portion and two end portions, a depressably actuable valve stem axially projecting from and attached to one end of said body portion, said valve stem having a discharge vent therein for releasing said fluids from said container; a variable spray assembly comprising an inner valve member and a rotatable outer valve member, said inner valve member including a coupling sleeve portion received by said valve stem in a fluid tight relationship, a valve spindle having internal surface portions defining with said valve stem an expansion chamber communicating with said discharge vent, skirt fastening means securing said inner valve member to said one end of said body portion, and flexible webbing extending from said skirt fastening means to said sleeve portion and valve spindle permitting said sleeve and spindle to be depressed with said valve stem independently of said skirt fastening means; said outer valve member having a valve cap rotatably mounted on said valve spindle; exhaust conduit means for selectively establishing a fluid exhaust connection with said expansion chamber and closing the same, said exhaust conduit means including a plurality of fluid control passages, each having a distinctive configuration, formed in one of said valve members and a discharge passage formed in the other of said valve members, said discharge passage being selectively registrable with each of said fluid control passages on rotation of said outer valve member, whereby fluid emitted from said container may egress from said expansion chamber, upon depression of said valve stem and spindle.

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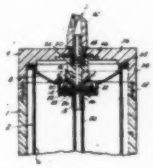
2,888,173. REUSABLE PRESSURIZED DISPENSER. Issued May 26 to Frank E. Wolcott, West Hartford, Conn.



A dispenser comprising an outer container, a removable cap for the outer container containing a dispensing valve, means to secure the cap to the outer container by movement toward the container, an inner container removably mounted within the outer container for holding a quantity of material to be dispensed and a pressurized propellent, said inner container having a top wall provided with an aperture, a depending siphon tube in registry with the aperture, and a depressable second valve between the tube and aperture, said depressable second valve comprising a cup member secured to the top wall between the siphon tube and aperture, and a disc of resilient material in the cup normally engaging the said top wall in sealing relationship and having a concavity in its lower surface permitting the disc to be depressed away from sealing relationship with said top wall, a depending stiff member on the removable cap fixed relative thereto and being of a length sufficient to engage and open said second valve as the cap is being secured to the outer container, and means forming a passage through said stiff member providing a continuously open passage between said dispensing valve and said siphon tube as long as the cap and outer container are secured together.

2,888,208. ATOMIZERS, IN PARTICULAR PERFUME ATOMIZERS. Issued May 26 to Rene Fedit, Paris, France, assignor to Les Vaporisateurs Marcel Franck, S.A., Paris.

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An atomizer unit which comprises, in combination, a container for the liquid to be atomized, said container having a cylindrical threaded neck at the top thereof, a cap having a cylindrical downward extension, said extension being threaded to engage said threaded neck, said cap including means forming a spraying nozzle, a tube carried by said cap and extending in said container, said tube opening at one end into said nozzle, the other end of said tube being at the bottom of said container, said

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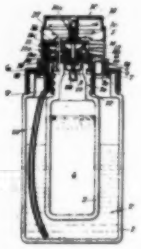
cap being provided with an inner recess in communication with said nozzle and with a central passage for the inflow of gas into



said recess, said passage opening into the bottom wall of said cap, a packing joint mounted on said bottom wall and surrounding the end of said passage, a reservoir adapted to contain gas under pressure located inside said container, said reservoir being provided at the top end thereof with a cylindrical threaded neck, a downward cylindrical threaded extension integral with said cap, coaxially located inside said first mentioned extension and adapted to cooperate with said last mentioned threaded neck for removably securing said reservoir to said cap with the edge of said last mentioned neck tightly applied against said packing joint around said end of said passage, said cap being provided, in the portion thereof located between said two extensions thereof, with a hole placing the inside of said container in communication with the atmosphere, a puncturable seal carried in said reservoir to close said opening, means carried by said cap and operable from the outside thereof for puncturing said seal after said reservoir has been secured to said cap, whereby once said seal has been punctured, gas under pressure can flow from said reservoir into said recess, valve means in said passage, resilient means carried by said passage for urging said valve means toward closing position, and means carried by said cap and operable from the outside thereof for opening said valve means.

Trade Mark Applications

Applications for registration of the following trademarks were published in recent issues of the *Official Gazette* of the U. S. Patent Office. In not all cases are there strictly aerosol trademarks, however many of the products listed below come within the category of those for which a possible future use in aerosols is foreseen.

DARASOL, for general purpose coating material for use in the formulation of protective and decorative coatings. Filed August 6, 1958 by Diamond Alkali Co., Cleveland, with first use claimed July 2 of same year.

I-L-T, for nebulizers for intermittent long-term nebulization of antibiotic and mucous liquefying drugs. Issued April 28 to Thomas J. Mahon, Inc., Englewood Cliffs, N. J., claiming first use June 16 of last year.

STARDUST, for pressurized containers of suede cleaner. Filed Sept. 26, 1958 by Plastic Film Corp., d.b.a. Fratex Home Fashions, Akron, Ohio, claiming first use May 24, 1957.

KOLOR KROME, for canned spray paint. Filed June 23, 1958 by The Kraus Accessories Co., d.b.a. California Custom Accessories Manufacturing Co., Los Angeles, with first use claimed for Dec. 20, 1957.

HEXTRI, for medicated shampoo for scalp infections, antiseptic vaginal gel, ear drops, dermatological ointment for bacterial infections, and pre-operative disinfectant spray. Filed March 3, 1958 by Warner-Lambert Pharmaceutical Co., Morris Plains, N. J., claiming first use March 3, 1958.

NITROSOL, for paint. Filed Dec. 19, 1958 by Jacob C. Swimmer, d.b.a. National Titanium Co., Vernon, Calif., claiming first use about 1923.

LIF-O-Gen, for portable oxygen dispensing units of the throw-away type for oral and nasal applicators and masks used in conjunction with said dispensing units. Filed Aug. 19, 1958 by Lif-O-Gen, Inc., Philadelphia, reporting first use Aug. 18 of the same month.

LIL SQUIRT, in outline letters on a design showing a boy using an aerosol shoe shine, for spray type shoe shining polish. Filed July 7, 1958 by Reynolds Distributing Co., Inc., Lincoln, Neb., with first use reported as May 14 of same year.

SURGAIRE, for deodorant spray ointment for application to wound dressing to counteract odors from necrotic and gangrenous tissue. Filed Oct. 7, 1958 by American Cyanamid Co., New York, reporting first use June 3 of same year.

IVY FOAM, for anti-infective preparations for the treatment of skin irritations. Filed Oct. 21, 1958 by Chas. Pfizer & Co., Brooklyn, N. Y., with first use reported Oct 14 of same year.

SURGAMYCIN, for topical spray ointment. Filed Oct. 22, 1958 by American Cyanamid Co., New York, claiming first use Oct. 2 of same year.

CERTI-WHIP, for dessert topping, including as its principal ingredients distilled water, sterilized vegetable oils, sugar, vegetable protein, emlsifiers, stabilizers, and vanilla. Filed April 28, 1958 by The Capital City Products Co., Columbus, O., with first use claimed for April 18, 1958.

ADAM'S APPLE, for body deodorant, hair dressing, and aerosol shave cream. Filed Sept. 17, 1958 by Colgate-Palmolive Co., New York, reporting first use June 17, 1958.

CLASSIFIED ADVERTISING

Rates for classified advertisements are ten cents per word, $2.00 minimum, except those of individuals seeking employment which *Aerosol Age* will run without charge. Check must accompany all classified advertisements. Address all replies to Classified Advertisements with Box Number, care of *Aerosol Age*, Box 31, Caldwell, N. J. Closing date: tenth of month preceding month of issue.

SITUATIONS WANTED

YOUNG MAN, NEW JERSEY RESIDENT: Creative ability, 15 years design and development experience, 5 years recent aerosol experience. Would like position with progressive company. Will consider interest in small business. Address Box 186, c/o Aerosol Age.

Prussin Speaks to Canadian Pharmaceutical Manufacturers

USE of inhalation aerosols in the detection of lung cancer, in the application of insulin and other diabetic drugs, as a new way to administer "mood elevators" and as a replacement for the hypodermic syringe in taking serums represent important new areas for research, Samuel B. Prussin, vice-president of Aerosol Techniques, Inc., Bridgeport, Conn., told members of the Canadian Pharmaceutical Manufacturers Association at their meeting in Windsor, Ont.

Today the application of inhalation aerosols in the administration of "miracle drugs" compares to the frontiers established with the development of the hypodermic needles and syringe, Mr. Prussin said.

A relatively simple and rapid method for diagnosing lung cancer in the physician's office has been brought about by aerosols, it was pointed out. The inhalation of finely sprayed, warm particles of propylene glycol causes the patient to bring up sputum from previously-inaccessible lung areas.

In his paper, titled "The Potential of Aerosols in the Ethical Pharmaceutical Field," Mr. Prussin urged as "wise investment" the application of research and development funds to the evaluation of drugs in inhalation aerosols in such other areas as (1) mucolytic enzymes in the treatment of asthma and the reduction of sputum viscosity in chronic bronchitis, (2) organisms providing immunity against virulent tubercle bacilli, 3) treatment of bronchial asthma and hay fever, and (4) the redevelopment of immunity to allergens or hypersensitization by means of inhalation allergens.

Mr. Prussin stressed advantages of the aerosol container with metered delivery over the plastic squeeze bottles in which the dose varies with the pressure of the user. The aerosol container would "obviate completely," he said, such negative features of the squeeze dispenser as the possibility of contamination of the medicaments, and the lack of uniform spray pattern and particle size. Furthermore, Mr. Prussin said, the aerosol permits the use of drugs which are insoluble in the media used to obtain a product suitable for squeeze bottle application.

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OI Research Fellowships

Fellowships for advanced studies in glass at Ohio State University and Brown University have been announced by Owens-Illinois Glass Co. as part of the company's expanding activities in the field of fundamental research. Each fellowship offers $3,500 for the support of the student. The total fellowship, including funds for equipment, materials and supplies, will be $6,600 at Ohio State and $6,000 at Brown.

Owens-Illinois, a producer of coated glass aerosol containers, operates one of the largest research and development programs in the packaging industry. The company is currently in the process of hiring additional personnel for fundamental research not only in the field of glass, but also in plastics and forest products.

de Elorza to YPA Meeting

Mr. and Mrs. John de Elorza of Old Empire, Inc., Newark, N. J., attending the recent annual convention of the Young Presidents Organization at the Americana Hotel, Bal Harbor, Florida. Other representatives of the aerosol industry present, were: Mr. and Mrs. H. R. Shepard, of Aerosol Techniques, and Mr. and Mrs. Gordon Lang, of Connecticut Chemicals of Canada, Ltd.

•

Babbitt to Promote Bonds

B. T. Babbitt Co., New York, last month joined forces with the U. S. Treasury to promote sales of U. S. savings stamps and Babbitt's products. Beginning in September, Babbitt's products will carry a coupon redeemable for U. S. savings stamps, which may either be used toward the purchase of a Series E savings bond or may be turned in at any post office for cash.

Marshall Lachner, Babbitt president, declared that the company would not raise prices to cover payments to the Treasury for the stamps, but later said that he considered the payments a legitimate advertising and promotion expense and therefore deductible for tax purposes. *The New York Times* concluded from this that "since Babbitt is in the 52% corporate tax bracket, this means the Government would be picking up 52 cents of each dollar spent by the company for savings stamps."

The campaign will be promoted under the slogan "Own a bit of America."

•

Rodmill Chemical Moves

Rodmill Chemical Co., Ltd., marketer of the "Flymist" brand of aerosol insecticides in Great Britain, has moved its main offices to Hanover Street, Liverpool 1, England.

New Compressed Gas Producer

General Dynamics Corp., New York, whose Liquid Carbonic Division has made overtures toward selling some of the aerosol users of compressed gas propellants, last month plunged even deeper into the field. General Dynamics purchased LaVerne W. Hench & Associates, one of the strongest independent organizations in the industrial and medical gas field.

•

Kiefer Adds to Sales Staff

The Karl Kiefer Machine Co., Cincinnati, manufacturers of aerosol filling equipment, last month announced the appointment of several additions to its sales staff. Heading the list is that of Philip V. V. Hurlburt, who recently joined the company, as sales executive.

David Shields, P.O. Box 711, Old Greenwich, Conn., was named sales representative for New England and much of New York State. J. Edward Baum will continue to cover New York City, Long Island, and the Metropolitan Area of Eastern New Jersey. Mr. Shields was formerly with the Standard Knapp Division of Emhart Manufacturing Co.

Wellington Associates, R.D. No. 2, Phoenixville, Pa., will represent Kiefer in Eastern Pennsylvania, Maryland, Delaware, Virginia, and Southern New Jersey. The sales company is headed by Charles H. Smith, Jr., a production engineer experienced in planning integrated packaging lines. Both Mr. Smith and Mr. Shields are also sales representatives for the Consolidated Packaging Machinery Co. of Buffalo, N. Y.

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Continental Can Names 2

Hazen P. Master has been appointed an assistant products sales manager for non-food cans in the Metal Division of Continental Can Co., New York. Formerly a sales representative in the company's Syracuse district, he will be headquartered in New York and will handle liquid detergent cans, F-style cans and paint containers.

James K. Cooper, also an assistant products sales manager for non-food cans, covers aerosol cans (for all products), motor oil and anti-freeze cans, and round cone top cans for non-food products.

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New Container Fabricator

Precision Molding, Inc., 41 Holly Place, Stamford, Conn., has begun operations specializing in the precision injection molding of small aerosol containers for the cosmetic industry made from nylon, "Delrin," polypropylene, and other materials.

Milton A. Sanders, president of the company, has had over a quarter century of experience in the plastics field. Jack Jaches is vice-president in charge of production.

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Gold Seal's New Product

At the risk of creating too obvious a play on words, we report that one of the hottest aerosol products currently on the market appears to be "Siz," Gold Seal's new foam charcoal lighter. And to give proper credit, it should be said that the valve is by Clayton, the lithographed container by Continental Can, and the filling by Peterson Filling.

Gold Seal is backing introduction of the product with an impressive television advertising and store promotion campaign. In the June 26 issue of *Life* Gold Seal joined ten food marketers in a 28-page foil-bound insert in the center spread of the magazine. The latter is to launch the first annual "Cookout Championship." The grand winner will receive $10,000 and Gold Seal's prize will be a heavy score in the sales column. This, incidentally, is Gold Seal's first aerosol product.

Gen. Chem. Names Farrell

James P. Farrell has been appointed vice-president of the General Chemical Division of Allied Chemical Corp., New York. He will head sales of "Genetron" aerosol propellants and refrigerants, agricultural chemicals, acids, laboratory reagents, and other special products.

•

Paints Grow in Canada

Aerosol paints have captured the attention of Canadian consumers in the last two years, states Elias M. Shapiro, vice-president in charge of sales for Plasti-Kote, Inc., Cleveland, a major manufacturer in the field. Plasti-Kote claims to be the leading seller of aerosol paints in Canada. Said Mr. Shapiro: "Business really boomed in 1958. But our reports for the first five months of 1959 indicate that Canadian sales may actually triple last year's."

Plasti-Kote sells in Canada through the Canadian Trade Corp., which is headed by Cecil Gardner in Montreal and represented by Charles Dalrymple in Toronto. Most sales are placed through automotive accounts outlets. Mr. Shapiro said that surveys indicate only 20% of the public is aware of the existence of paint in pressurized cans. "Those who use aerosols," he stated, "reportedly prefer them, two to one, over conventional paint containers."

He predicted that the aerosol paint industry will sell 100 million units in North America during 1960. Plasti-Kote currently produces 2,100 different colors, 350 of which match the major automobile paints from 1957 - 1959.

•

P.I. in New Quarters

The Packaging Institute last month formally opened its newly decorated offices at 342 Madison Avenue, New York. After considering over 20 different new locations in midtown New York, the institute elected to remain at the same address at which it was launched in 1939. One feature of the new offices is a spacious library-conference room to accommodate meetings of as many as 25 packaging people.

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Colgate Appoints Leigh

Gilbert M. Leigh has been named manager of the newly-created Pioneering Research Area of Colgate-Palmolive Company's Corporate Research Department, it was announced by the Company late last month. Previously technical services manager, he will assume responsibility for the creation, integration and functioning of a project development section and a statistical planning and analysis section at Colgate's research laboratories in Jersey City.

The project development section will study new technical developments and new manufacturing processes which may bear on existing operations and on the company's program of diversification. The statistical section will apply statistical planning to the design of experiments and will analyze their results. In addition, it will work on information storing and computing systems on a long range basis.

Mr. Leigh also retains responsibility for the perfumery and essential oils section and the engineering materials section.

OVER THE TRANSOM

ONE of the top social affairs in the aerosol industry for the past four summers has been the golf outing initiated back in 1955 by VCA—and then hosted successively by Precision Valve, Continental Can and Crown. This year there will be a larger group of co-sponsors. Any supplier interested in participating as a host is invited to contact this magazine for further details.

Invitations will be issued in mid-July for an Aerosol Industry Invitational Golf Tournament to be held August 11th at Winged Foot Golf Club, Mamaroneck, N. Y., scene of the recent National Open. Needless to say, golfers in the aerosol industry are looking forward eagerly to the opportunity of playing this championship course.

* * *

Another affair on the social side that brightened up the developing summer season for those in the aerosol business was Jack Wittke's annual clambake and outing at Jack's home in Westfield, N. J. The date was June 30th and the activities included horse shoe pitching, basket shooting, iron bandits, gittar playing and pinching the waitresses. Cast of characters included past, present and prospective users of OEL aerosol valves.

* * *

A course on aerosols is being conducted at the State University of Iowa's summer school, under the direction of Dr. Seymour Blau. The CSMA supplied considerable reference material, including copies of the latest edition of its Aerosol Guide to assist in formulating the curriculum. We are happy to report that the principal emphasis at Iowa seems to be on teaching the students something about aerosols rather than getting endowments from aerosol suppliers or gifts of laboratory apparatus and equipment.

* * *

The CSMA will mail entry blanks late in August for entries in the 1959 Aerosol Packaging Contest. Last year's contest attracted some 200 entries. The same general list of product classifications is contemplated for this year, with the possibility that a Food Division may be set up if there are enough entries in this new category. If you have a pressure packed product that you are rather proud of, now is the time to think of entering it for one of the awards.

* * *

The Government, particularly the military, would like to see long-lasting insect repellents, reports the latest bulletin of the National Inventors Council. The report, which conceded that diethyl toluamide gives good protection against many insect species for at least six hours, points out that what is actually needed is a material which will protect a man for at least 12 hours. It also calls for newer and better ways of testing insect repellents, claiming that current methods are "costly, tedious, and relatively inaccurate."

* * *

Exporters of aerosol components and equipment to Europe this year will have an added worry—namely—whether or not another free-trade alliance will be formed there to counterbalance the European Economic Community (France, West Germany, Italy, the Netherlands, Belgium, and Luxembourg). The new grouping takes in Britain, Sweden, Denmark, Norway, Switzerland, Austria, and Portugal, several of which are important aerosol markets. U. S. economic experts are eyeing the trend with some misgivings, seeing the danger of two trade barriers in Europe to U. S. goods. They say that one solution might be reciprocal reduction of tariffs.

* * *

Speaking of Europe, Phil Meshberg, president of Emson Research, just returned from an extensive trip through Western Europe and reports that the aerosol idea is snowballing. A number of major pharmaceutical and perfume houses, traditionally even more conservative than their U. S. counterparts, have given way to the obvious and are actively studying components for their products.

* * *

In case you haven't noticed, the volume of matching car and other appliance paints in aerosol cans is increasing rapidly. Latest to bring out such a product is Lambretta, leading world manufacturer of motor scooters, which recently introduced an aerosol paint line of four colors: red, Winchester blue, Mark III off-white, and slate-grey.

"Oh no, you don't buy it, you subscribe to it!